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VOLUME II

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# DAMAGE TOLERANCE ANALYSIS FOR MANNED HYPERVELOCITY VEHICLES

## VOLUME II - SOFTWARE USER'S MANUAL

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Air Force Systems Command
Wright-Patterson Air Force Base, Ohio 45433-6553

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This technical report has been reviewed and is approved for publication.

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The objective of this program was to provide a fracture mechanics based life prediction procedure for hypersonic airframe structures subjected to combined mechanical loadings and thermal profiles. Existing routines were used along with element test data to develop this procedure. The accuracy of the procedure was determined by predicting the crack growth under thermomechanical load histories typical of advanced fighters and aerospace vehicles, and then comparing those predictions with test results. Limitations in the ability of this procedure to predict the test results were used to formulate recommendations for further modeling efforts and research.

A fracture mechanics based life prediction procedure was developed for hypersonic airframes subjected to thermomechanical load profiles. The analysis that was developed models crack growth behavior in metals, accounts for the effects of temperature on yield strength and fracture toughness, and includes the effects of sustained loads at elevated temperature on crack growth rate. The analysis was incorporated into a computer (cont'd)

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routine named DAMAGE. Predictions made with the DAMAGE routine were within 20 percent of the test lives for 67 percent of the combined thermomechanical load history tests performed.

## FOREWORD

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The Structural Research Department of McDonnell Aircraft Company was responsible for the performance of this program. The Program Manager was Charles R. Saff. Principal Investigator and principal author of this report was David M. Harmon.

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# SECTION I

## INTRODUCTION

Implementation of the Air Force structural integrity philosophy as defined in MIL-STD-1530A requires efficient, accurate, and cost effective prediction of crack growth behavior under complex combinations of mechanical loading and chemical/thermal environments. Current Air Force airframe structural life predictions are based on isothermal analyses because the times at high temperatures are short and have little effect on life prediction. At most, a "worst case" temperature is selected for limited testing and allowables generation for high temperature areas of the structure.

In the aircraft engine industry, life analyses emphasize other factors. The engine environment dictates that temperature, load frequency, and stress ratio effects be modeled accurately, while the mechanical load interaction effects are either ignored or simplified. Temperature variations are much more accurately modeled in analyses and testing for engine environments than for airframes.

The ever-increasing mission requirements for Air Force hypervelocity and high Mach number aircraft accentuate the importance of the temperature environment to the structures engineer. Tests have shown that the thermal-mechanical load profiles experienced by such vehicles can produce lives considerably shorter than those predicted by "worst case" isothermal test data and analyses.

A fracture mechanics based life prediction procedure for hypersonic airframe structures subjected to combined mechanical loadings and thermal profiles has been developed and programmed. Existing routines and element test data helped to develop this procedure. The accuracy of the procedure was determined by predicting the crack growth under thermomechanical load histories typical of advanced fighters and advanced aerospace vehicles, and comparing those predictions with test results.

## SECTION II

## PROGRAM SUMMARY

1. Program Objective - A method has been developed for the fatigue life prediction of metals subjected to combined mechanical and thermal loads. This analysis has been incorporated into a computer program called "Damage Analysis of Metals subjected to AGgresive Environments" (DAMAGE). Volume I of this report documents the analytical procedures as well as the model development and verification test data for the contract (Reference 1). Volume II is the software user's manual. DAMAGE is an extension of a computer program known as CRKGRO which was developed by Rockwell International under an Air Force contract (Reference 2) for room temperature spectrum fatigue analysis.

The baseline fatigue crack growth rate equations in DAMAGE are the Modified Walker and Chang equations with a variable threshold stress intensity factor range. Load interaction effects are accounted for through the use of the Generalized Willenborg model for tensile overloads and the Chang acceleration scheme for compressive underloads.

The DAMAGE program includes the following capabilities for elevated temperature analysis: 1) a temperature dependent Walker equation for fitting crack growth data; 2) a Wei-Landes method for sustained load crack growth; 3) Larson-Miller data which will determine the effective yield strength based on time at temperature; 4) a method which accounts for a reduction in yield strength with temperature; 5) a method for predicting the effects of temperature on fracture toughness; and 6) a temperature dependent overload shut-off ratio for calculating retardation effects caused by overloads. DAMAGE will analyze crack growth in specimens with part-through or through cracks emanating from open holes or slots. Specimens may be subjected to axial loads and/or out-of-plane bending moments.

DAMAGE was made extremely user-friendly for the interactive user. Error traps were incorporated into the code to prevent premature termination of an analysis session. The user is prompted for revised data whenever input data is found to be erroneous. The code is fully commented and streamlined to make the baseline code and the addition more easily deciphered.

In addition, an interactive plotting routine has been incorporated into DAMAGE. This routine will generate a low resolution plot on any terminal, such that a quick graphical reference can be made of the output data. This data is also stored in output data files, so that it can be plotted on any in-house high resolution plotting routine.

2. Technical Discussion - The purpose of this contract was to use relatively simple methods to analyze elevated temperature crack growth. These methods were programmed and added to the room temperature analysis routines in CRKGRO. The resulting program is called DAMAGE.

The methods described in this section have been used by various investigators to model specific characteristics of crack growth behavior. In this contract, these methods were consolidated into one crack growth analysis scheme. The flow chart for the analysis program is presented in Figure 1.

a. Crack Growth Rate Model - The baseline fatigue crack growth rate equation in CRKGRO is the modified Walker equation for positive stress ratios, and the Chang equation for negative stress ratios:

for $R \geq 0$ and $\Delta K > \Delta K_{th}$

$$dc/dN = C\,[\Delta K\,(1-R)^{M-1}]^N = C\,[(1-R)^M K_{max}]^N$$

for $R < 0$ and $\Delta K > \Delta K_{th}$

$$dc/dN = C\,[(1+R^2)^Q K_{max}]^N$$

for $\Delta K \leq \Delta K_{th}$

$$dc/dN = 0$$

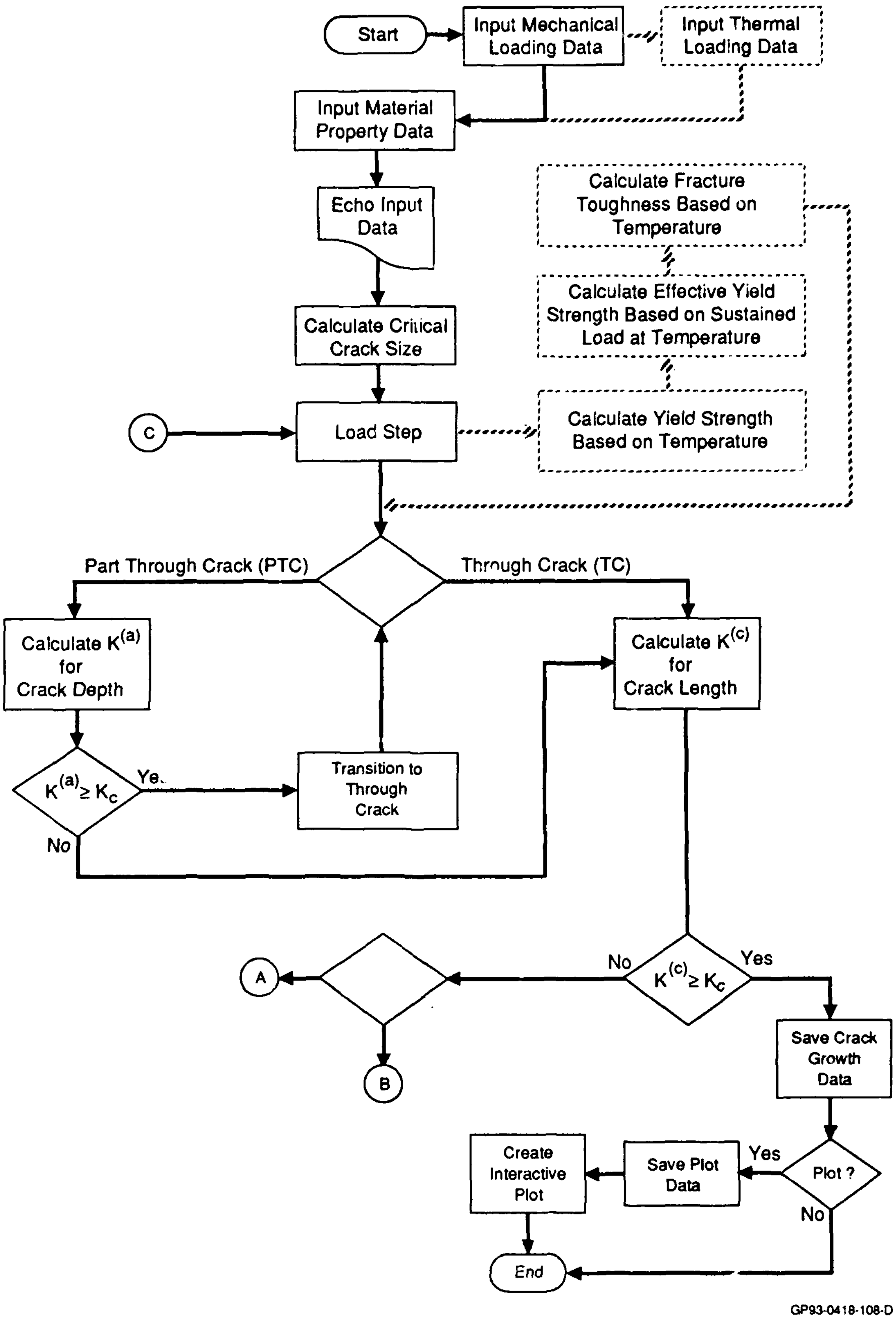


**Figure 1. CRKGRO/DAMAGE Flow Chart**

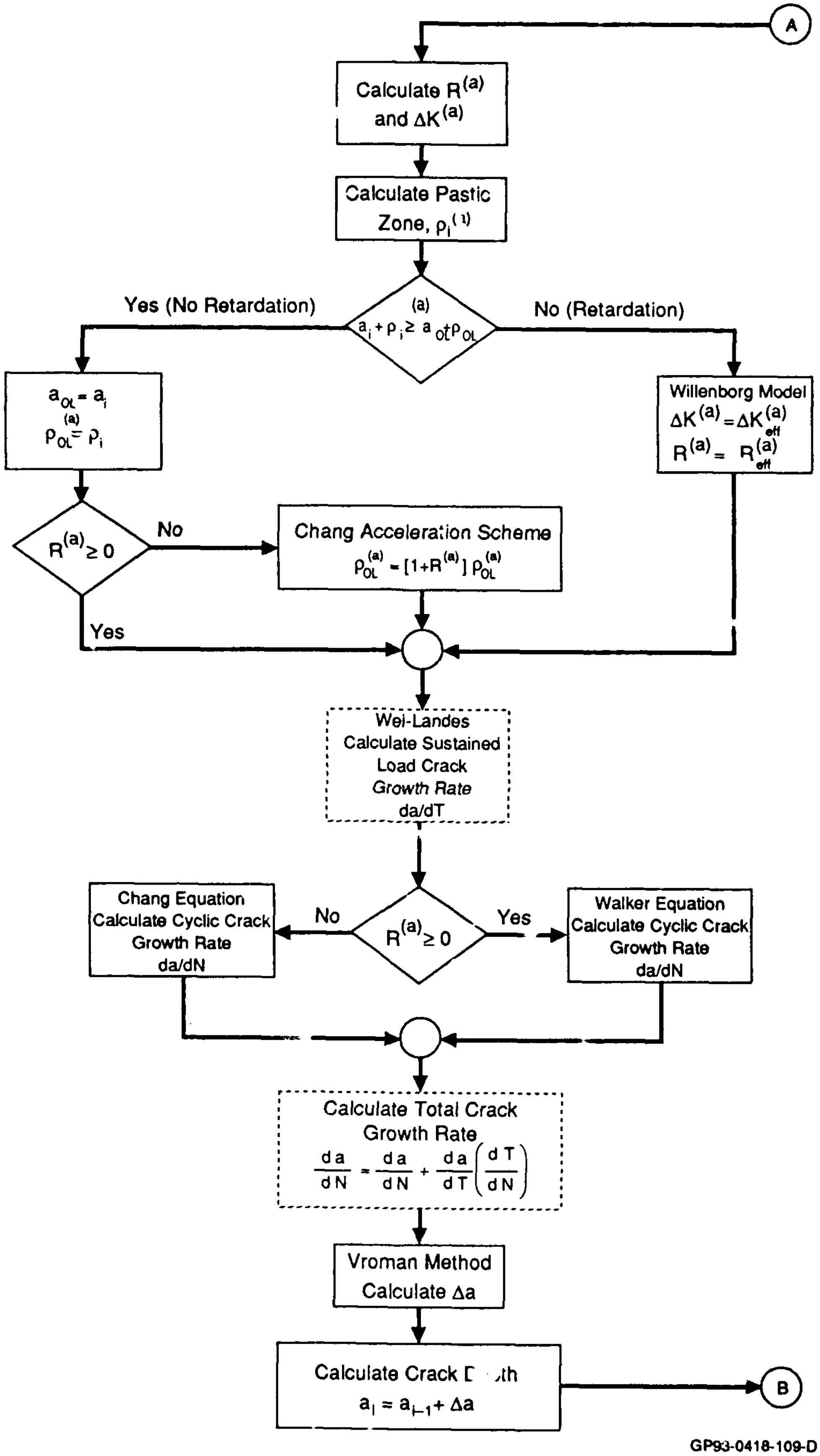


**Figure 1. (Cont.) CRKGRO/DAMAGE Flow Chart**

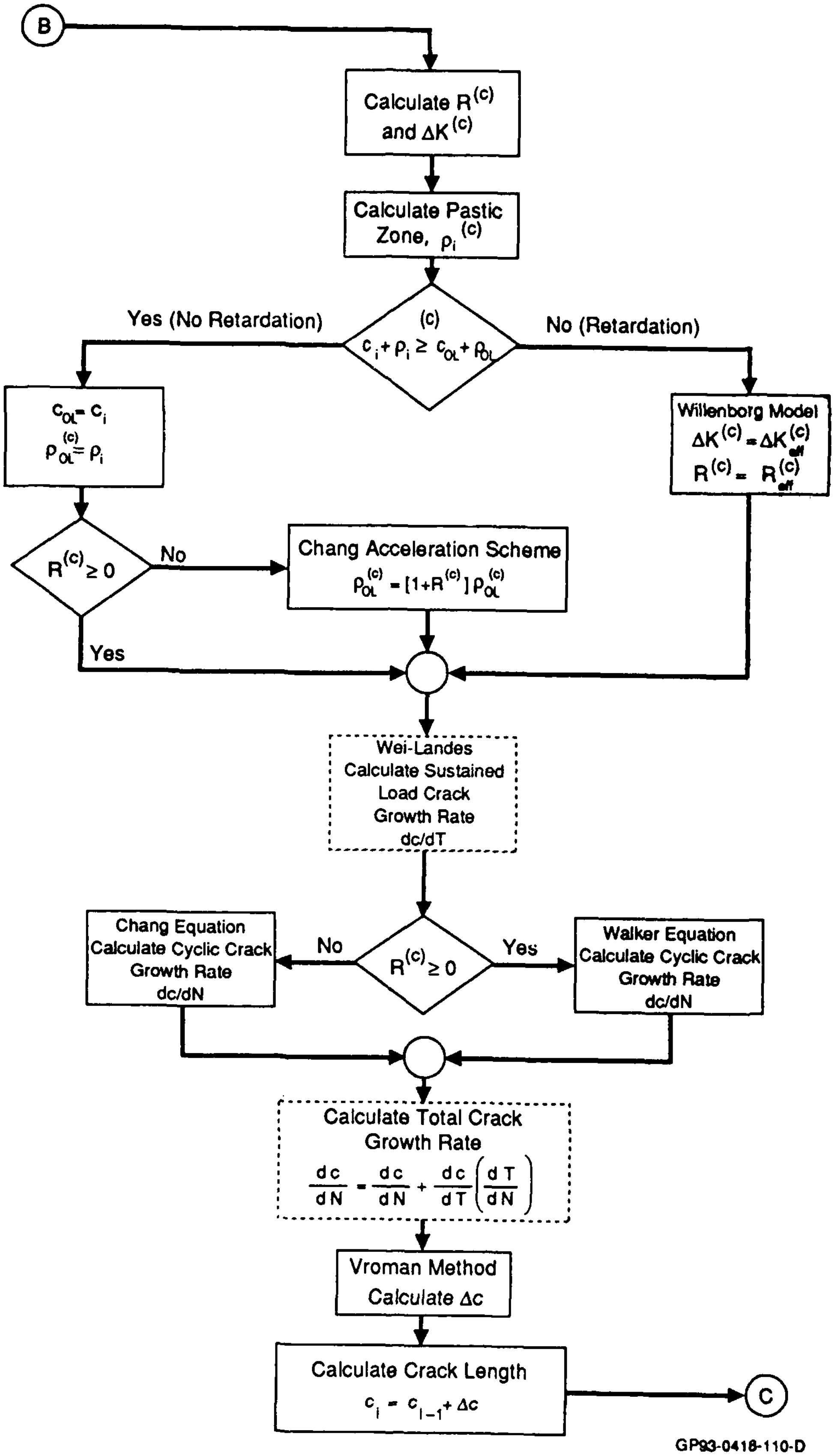


**Figure 1. (Concluded) CRKGRO/DAMAGE Flow Chart**

where C and N are growth rate constants, and M and Q are stress ratio empirical exponents. The values of C, N, M, and Q are determined within DAMAGE. The user must supply the crack growth rate data. Data may be input for any number of stress ratios and for up to three different temperatures (including room temperature).

The constants C and N are determined from R=0 test data. When R=0, the above equations reduce to:

$$dc/dN = C\, K_{max}{}^{N}$$

The equation for a line is found when the log of both sides is calculated:

$$\log(dc/dN) = \log(C) + N \log(K_{max})$$

A least squares fit is then used to determine the values of C and N.

Data for positive stress ratios, R>0, is used to determine M. An expression for M is found by taking the ratio of the dc/dN equation for R>0 with the dc/dN equation for R=0.

$$\frac{dc/dN_{R>0}}{dc/dN_{R=0}} = \zeta = \frac{C\,[(1.0-R)^{M}\, K_{max}]^{N}}{C\, K_{max}{}^{N}} = (1.0-R)^{M\,N}$$

The equation for M is determined by taking the log of both sides of the above equation.

$$M = \sum_{i=1}^{npt} \log(\zeta_i)/[N \log(1.0-R)]$$

where npt = number of dc/dN vs. $\Delta K$ data points for R>0 curves.

A similar equation for Q is determined using the same procedure. In this case, however, only data from negative stress ratio (R<0) tests are used. The expression for Q is:

$$Q = \sum_{i=1}^{npt} \log(\zeta_i)/[N \log(1.0+R^2)]$$

The Modified Walker and Chang equations only allow for linear curve fits of crack growth rate data. However, if the dc/dN vs. $\Delta K$ data is partitioned, it is possible to obtain a bi-linear curve fit. In this case, the user must provide the approximate location of the transition point. The routine will use this point to partition the crack growth rate data. Once the expressions for the upper and lower crack growth curve have been calculated, the actual transition point will be determined and used within the program.

To account for the effects of elevated temperatures, the routine requires crack growth data at room temperature and at either one or two elevated temperatures. Each set of data is fit using the Modified Walker and Chang equations, such that values of C, M, N, and Q are determined for each temperature. Given a value of $\Delta K$, the crack growth rate, dc/dN, is calculated for each temperature. If data for only two temperatures is provided, then the actual dc/dN for a specified temperature is calculated by interpolating between the room and maximum temperature dc/dN values. If data for three temperatures is provided, a quadratic curve is fit to the dc/dN data.

The threshold value of $\Delta K$ is determined by the following:

$$\Delta K_{th} = (1 - A\ R)\ \Delta K_{tho}$$

where $\Delta K_{tho}$ is the threshold value obtained from R = 0 constant amplitude tests. A is an empirical constant obtained from $\Delta K_{th}$ data for constant amplitude tests with various stress ratios. The value of A is solved for by rearranging the above equation and must be supplied by the user.

$$A = [(\Delta K_{tho} - \Delta K_{th}) + 1]/R$$

b. <u>Load Interaction Model</u> - The load interaction model in DAMAGE is the Generalized Willenborg model for tensile overloads with a reduction in overload zone size proposed by Chang for compressive underloads.

The Willenborg model (Reference 3) is used to predict crack growth retardation due to overload cycles in the load spectrum. Figure 2 presents a drawing of a crack immediately following an overload. The crack length is $c_{ol}$ and the plastic zone created by the overload is $\rho_{ol}$. The crack length associated with a load cycle following the overload is represented by $c_i$. Similarly, the instantaneous plastic zone associated with the same load cycle is designated as $\rho_i$.

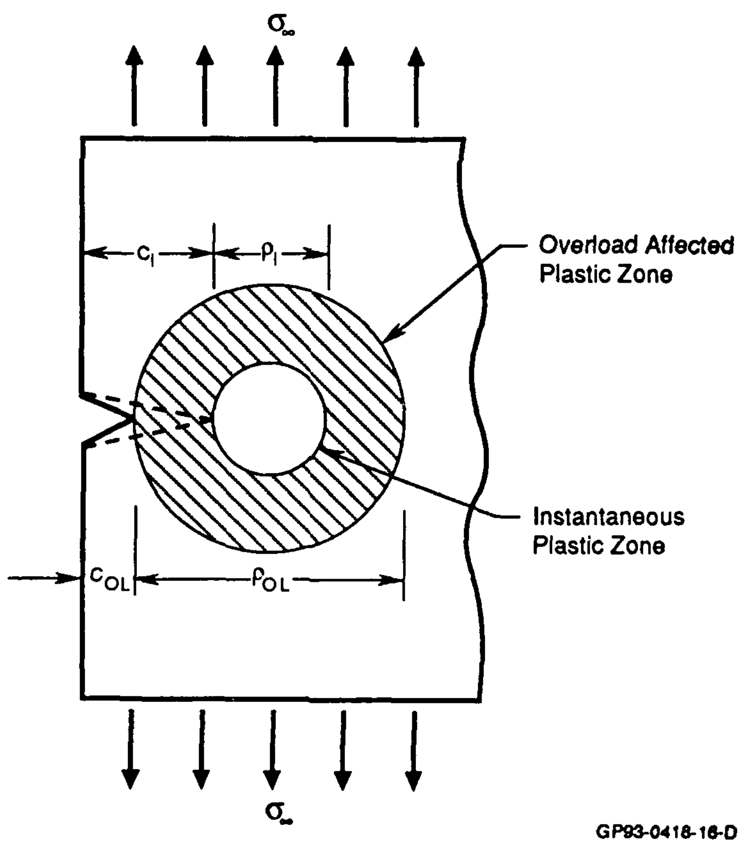


**Figure 2. Plastic Zone at Crack Tip**

The underlying principle of the Willenborg model is that crack growth retardation will occur after an overload as long as $c_i + \rho_i < c_{Ol} + \rho_{Ol}$. These sums are defined as the instantaneous interaction zone, $z_i$, and the overload interaction zone, $z_{Ol}$, respectively. To accommodate this idea, the model calculates an effective stress intensity, $\Delta K_{eff}$, and an effective stress ratio, $R_{eff}$, to calculate the crack growth rate.

The Generalized Willenborg model (Reference 4) predicts that crack growth is shut-off when $K_{eff-max}$ equals the maximum threshold stress intensity of the material, $K_{th-max}$. The expressions for the effective stress intensities are:

$$K_{eff-max} = K_{\infty max} - \phi \, [K_{Ol-max} (1 - \Delta c/\rho_{Ol})^{1/2} - K_{\infty max}]$$

$$K_{eff-min} = K_{\infty min} - \phi \, [K_{Ol-max} (1 - \Delta c/\rho_{Ol})^{1/2} - K_{\infty max}]$$

where

$$\phi = (1 - K_{th-max}/K_{\infty max})/(R_{SO} - 1)$$

and

$$R_{SO} = K_{Ol-max}/K_{\infty max}$$

The overload shut-off ratio, $R_{SO}$, is obtained from test data. A good method for obtaining $R_{SO}$ is to fit crack growth data from baseline isothermal spectrum load fatigue tests. This method was used in this contract and is described in Volume I, Section V-5c.

The effective stress intensity, $\Delta K_{eff}$, is calculated using the standard fracture mechanics formula:

$$\Delta K_{eff} = K_{eff-max} - K_{eff-min} = K_{\infty max} - K_{\infty min} = \Delta K$$

The effective stress ratio is calculated as:

$$R_{eff} = K_{eff-min}/K_{eff-max}$$

The Willenborg model reduces the stress ratio below the applied stress, but does not change the stress intensity range. The model will retard crack growth until the current load interaction zone extends to the end of the overload interaction zone.

The reduction of the overload retardation effect caused by a compressive underload is accounted for through the "effective overload interaction zone" concept proposed by Chang (Reference 2). In this model, the plastic zone size is modified to be:

$$\rho_{eff} = (1 + R_{eff})\ \rho$$

where $R_{eff}$ is the negative effective stress ratio ($R_{eff} \leq 0$).

In DAMAGE, the plane strain plastic zone equation is used at the depth of a part-through crack. The user has the option of using plane strain or plane stress plastic zone size equations in the length direction to analyze through cracks and part-through cracks. The plane stress and plane strain plastic zone size equations for any load cycle are:

$$\rho = [\gamma/(2\pi)]\ (K_{\infty max}/F_{ty})^2$$

where

$$\gamma = 1 \text{ - plane stress}$$
$$\gamma = 1/3 \text{ - plane strain}$$

$F_{ty}$ is the material tensile yield strength and $K_{\infty max}$ is the maximum applied stress intensity factor.

c. Temperature Effects on Material Properties - Material properties change with temperature. DAMAGE will account for changes in yield strength, fracture toughness, and overload shut-off ratio. In each case, DAMAGE accepts input files which contain temperature vs. percent reduction of the material property data.

Yield Strength - The yield strength will be reduced due to temperature, resulting in a larger plastic zone in front of the crack tip. The crack growth rate is reduced as long as the crack length does not exceed the plastic zone. Therefore, if the plastic zone size increases, the crack growth rate is reduced for a longer period of time.

Fracture Toughness - The fracture toughness of a material will generally improve with increased temperatures. The net effect is that the crack will grow longer before failure because the critical crack length will increase. However, when the crack is in the vicinity of the critical crack size, the crack growth rate is rapid. As a result, it will not take many cycles for the crack to grow to the point where the critical crack length and the fracture toughness are exceeded. Therefore, the change in fracture toughness should have a minimal effect on life predictions.

Overload Shut-Off Ratio - The generalized Willenborg model accounts for the ability of high spectrum loads to retard the crack growth produced by subsequent low loads. This retardation is accounted for by using the overload shut-off ratio, $R_{SO}$, which is defined as:

$$R_{SO} = K_{O1\text{-}max}/K_{\infty max}$$

This ratio determines the magnitude of the overload required to shut-off crack growth completely for subsequent load cycles. A high $R_{SO}$ value would indicate that the material is insensitive to overloads. Conversely, a low $R_{SO}$ would indicate that the predicted crack growth is retarded after an overload and would result in a longer predicted life.

Values for the overload shut-off ratio, $R_{SO}$, are determined by correlation with isothermal spectrum load fatigue test results. These tests must be performed at room and elevated temperatures since $R_{SO}$ will change with temperature.

d. Environmental Considerations - The Wei-Landes approach for environmental acceleration of crack growth was incorporated into DAMAGE (Reference 5). This method accounts for the effect of time at load upon crack growth.

It uses the crack growth rate data for R=0 tests at high and low frequencies to determine dc/dt for a given temperature.

The Wei-Landes method of predicting elevated temperature crack growth, separates the crack growth due to mechanical load cycling from that due to sustained loads. It is assumed that the total crack growth is the sum of these two terms.

$$dc/dN = dc/dN_C + dc/dN_S$$

Mechanical load crack growth is measured in terms of length per cycle, dc/dN. Sustained load crack growth is measured in terms of length per time, dc/dt. The cyclic crack growth rate is determined using the Modified Walker equation as discussed in an earlier section.

Figure 3 demonstrates how the Wei-Landes model determines dc/dt from the differences between high and low frequency crack growth rate data. In this figure, 10 Hz is the high frequency and 0.10 Hz is the low frequency. It is assumed that hold time has little or no effect on crack growth rate at the 10 Hz frequency. Thus the difference between the crack growth rates of cycles having the 10 second hold times (0.10 Hz) and those having no hold times (10 Hz) is used to determine dc/dt for each test temperature. The dc/dt versus $K_{max}$ curves for each temperature are integrated as a function of stress intensity factor to determine the cracking due to sustained loads during (1) loading, (2) hold at maximum load, and (3) unloading.

To use the Wei-Landes method in DAMAGE, two crack growth curves must be supplied: one obtained from a high frequency test and one from a low frequency test. An optimum curve for the low frequency data would have the same loading speed as the high frequency data, but with a hold time at peak load that equals the maximum hold time expected in service.

e. Creep Crack Growth - A major concern in elevated temperature crack growth in metals is creep. Creep will blunt the crack tip, and therefore reduce the crack growth rate.

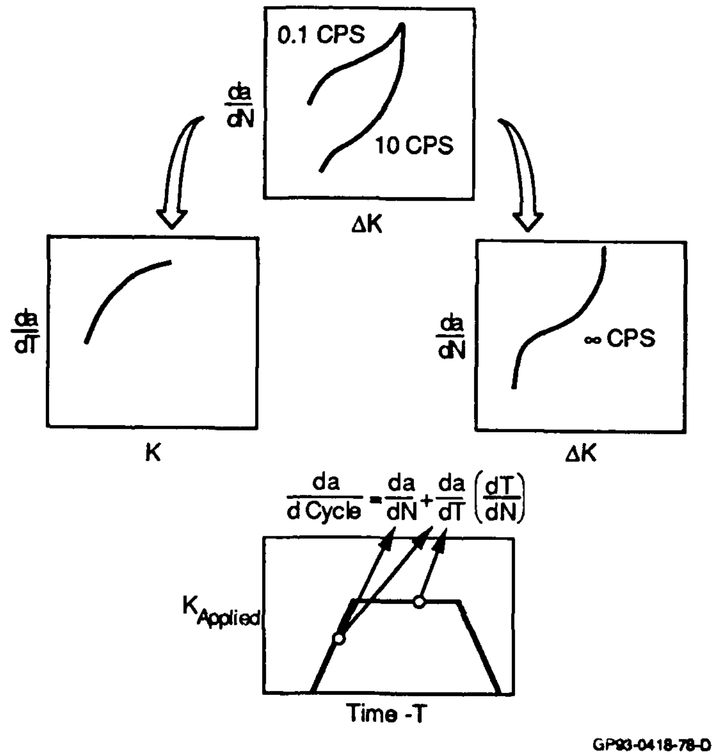


**Figure 3. Wei - Landes Method**

The crack growth model incorporated into DAMAGE accounts for creep by modeling the plastic zone in front of the crack tip as shown in Figure 4. The plastic zone size increases when yield strength is reduced at high temperatures. This zone is also affected by increased plasticity with hold time at temperature (creep). The plastic zone size is calculated as follows:

$$\rho = [\gamma/(2\pi)]\ (K_{max}/F_{ty})^2$$

where

$$\gamma = 1 \text{ - plane stress}$$
$$\gamma = 1/3 \text{ - plane strain}$$

and

$$F_{ty} = \text{material yield strength.}$$

The plastic zone size is inversely proportional to the material yield strength.

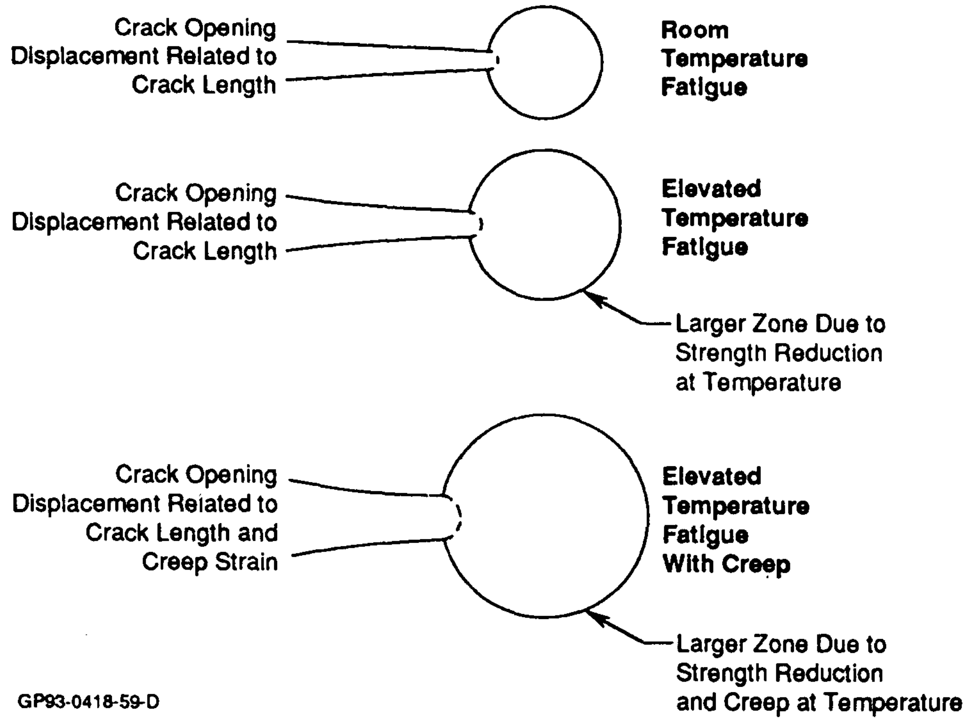


**Figure 4. Effect of Temperature and Sustained Loads on Plastic Zone Size**

Creep is introduced into this model through the effective yield strength, $F_{ef-ty}$. The effective yield strength is defined as the stress level required to produce 0.2 percent strain in a material at a given temperature and hold time. The effective yield strength is calculated at each load cycle, and is used to determine the plastic zone size. As the temperature and hold time increase, the effective yield strength decreases and the plastic zone size increases. Crack growth is retarded as long as the current plastic zone is smaller than the previous one.

DAMAGE allows the use of Larson-Miller data to determine the effective yield strength of the material given a temperature and hold time. A typical Larson-Miller plot is shown for 6Al-2Sn-4Zr-2Mo titanium in Figure 5. The effective yield strength and the temperature and hold time parameter, P, must be input.

$$P = (460 + T)(P_{lm} + \log(t_h))\ 10^{-3}$$

where T is the temperature in degrees Fahrenheit, $t_h$ is the hold time in hours, and $P_{lm}$ is a material constant used to fit the data.

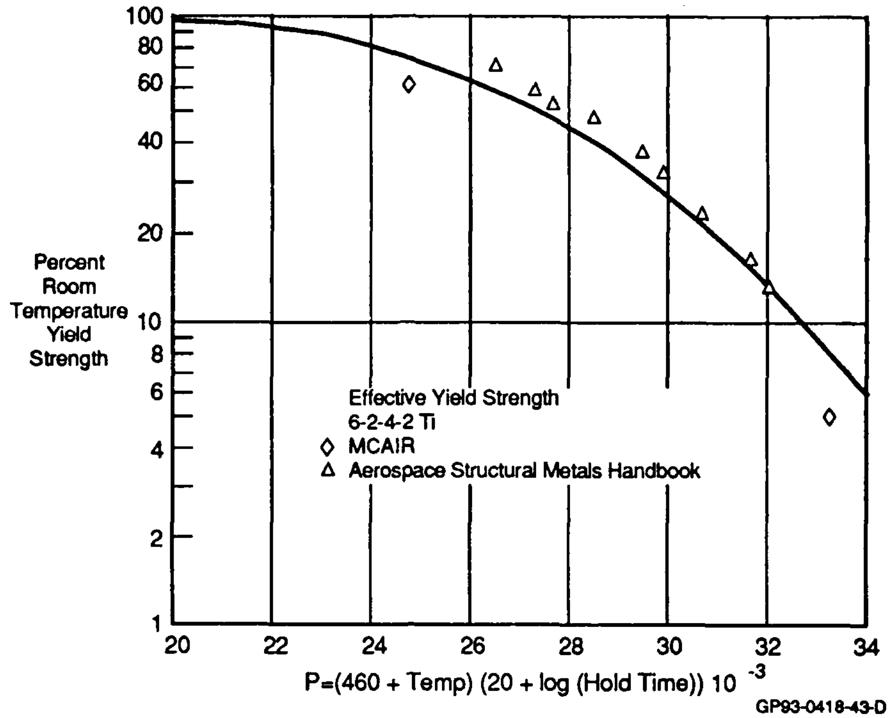


**Figure 5. Larson – Miller Plot for 6-2-4-2 Ti**

f. Damage Accumulation Technique - Damage accumulation in DAMAGE is based on the Vroman Linear approximation method. In this method, the crack growth for a given stress step is assumed to be 1 percent of the current crack length. The stress steps are input by the user and consist of a number of constant amplitude cycles, N, in which the stress varies from the maximum stress in the cycle, $\sigma_{max}$, to the minimum stress in the cycle, $\sigma_{min}$.

For a given stress step, the crack growth rate, dc/dN, is calculated using the Walker equation. The crack growth for the step is assumed to be $\Delta c = 0.01c$, where "c" is the instantaneous crack length. The number of cycles in the stress step, N, is then compared to the actual number of cycles required to achieve the assumed crack growth:

$$N_{act} = 0.01\ c\ /\ (dc/dN)$$

If $N_{act} > N$, then

$$\Delta c_{act} = N\ dc/dN$$

$$c = c + \Delta c_{act}$$

The analysis then proceeds to the next stress step.

If $N_{act} \leq N$, then

$$\Delta c_{act} = \Delta c = 0.01\ c$$

$$c = c + \Delta c$$

One must then examine the remaining cycles in this stress step, $N_{rem} = N - N_{act}$. The procedure described above is repeated until all of the cycles in the step have been examined. At that point, the analysis proceeds to the next stress step.

g. Geometric Capabilities - An extensive library of stress intensity factor solutions is available in DAMAGE (Figure 6). The crack library module consists of ten subroutines, each containing one stress intensity solution. For part-through cracks, shape change is predicted based on the assumption that growth in the two directions can be characterized by the stress intensities at the extreme points. Compound solutions expressed in polynomial form are typically used in these routines to summarize the effects of width, thickness, crack depth, crack length, and crack aspect ratio on stress intensity.

CRKGRO contains stress intensity solutions for plates loaded axially in tension. In DAMAGE, these solutions were updated and new solutions were added for plates subject to axial tension and/or out-of-plane bending moments. Stress intensity solutions were obtained from three sources: 1) Newman and Raju; 2) Tada, Paris and Irwin; and 3) Rooke and Cartwright (References 6 through 9). In these solutions, stress intensity factors are determined separately for tension and bending. The total stress intensity is then the sum of the two solutions.

$$K = (\sigma_t\ \beta_t + \sigma_b\ \beta_b)\ (\pi c)^{1/2}$$

where "c" is the crack length, $\sigma_t$ and $\sigma_b$ are the tension and bending stresses, and $\beta_t$ and $\beta_b$ are the tension and bending geometry factors. The bending stress, $\sigma_b$, is determined from the out-of-plane bending moment, M, and is calculated as:

$$\sigma_b = M\ a_0/I$$

where I is the moment of inertia. For a rectangular cross-section of width, W, and thickness, t, I is equal to $(W\ t^3/12)$. $a_0$ is the distance between the mid-plane of the plate and the location where the bending stress is calculated. At the specimen surface, $a_0 = t/2$ and the bending stress is

$$\sigma_b = 6\ M\ /\ (W\ t^2)$$

Appendix A identifies each specimen geometry and the appropriate stress intensity factor solutions for plates subject to tension and/or bending. An additional subroutine was added to DAMAGE which allows the user to supply stress intensity factor data for specific cases not covered in the solution library. This data file must contain crack length vs. geometry factor data, $\beta$. Data may be provided for specimens loaded in tension and/or subject to out-of-plane bending.

| Code No. | Description | Geometry |
|---|---|---|
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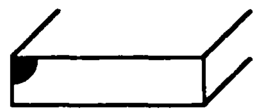
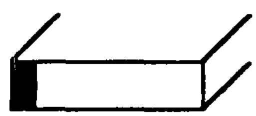
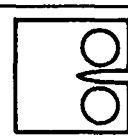
| 1020 | One Corner Crack from Center Open Hole |  |
| 1030 | Two Corner Cracks from Center Open Hole |  |
| 1040 | One Corner Edge Crack |  |
| 2010 | Center Crack |  |
| 2020 | One Crack from Center Open Hole |  |
| 2030 | Two Cracks from Center Open Hole |  |
| 2040 | One Edge Crack |  |
| 2050 | Two Edge Crack |  |
| 2060 | ASTM Compact Tension Specimen |  |

GP93-0418-122-D

**Figure 6. Stress Intensity Factor Solutions**
DAMAGE

# SECTION III

## DAMAGE DESCRIPTION

1. Input Data - DAMAGE is designed to be a quick and easy to use computer program that can be run in interactive or batch mode. The program runs from data that can either be input interactively or read from a specified file. Once the data has been input, the user may review the data and edit it as necessary. After successful execution, the program will write the input data to a file if requested.

The echo/edit routine is used to modify an existing set of data. Once the data has been read into the program or entered interactively, the user is asked if editing is desired. If this option is selected, the user is presented with a menu which lists the analysis modules for which data may be edited. The editing process starts with an echoing of the input data for that section of analysis. The user is asked if this data is correct. If it is correct, the routine exits to the first menu. If the data is incorrect, the user may modify any or all of the data listed. The editing routine also allows addition of data sets for analysis modules not originally selected. Similarly, the user may eliminate an analysis option, or add or delete material systems.

a. Error Trapping - The routine has error traps to assist the user when answering questions interactively. These error traps are designed to catch simple typographical errors. Without these error traps, the program would stop and would have to be re-run from the start. Another type of error trap included in the routine checks a numeric response when choosing from a list of numbered options. If your entry does not appear in the given list, then the program will ask you to try again.

b. Data Description - In this section, a list of the input data and a description of each input variable is provided. An input file may be created from the following list of data, however it is easier to enter the data interactively and then store that data in a file prior to program execution.

Problem Title

HDNG - maximum of 70 characters

Material Properties

MATID - material title card, maximum of 60 characters
Room Temperature Crack Growth Rate Data

NBISL(1) - 0 single slope curve fit of dc/dN vs. $\Delta K$
1 - bi-slope curve fit of dc/dN vs. $\Delta K$

MATDAT(1) - name of file containing dc/dN vs. $\Delta K$ data for high frequency tests with different R's

ATLEV(1) - approximate value of dc/dN where transition from lower region curve fit to upper region fit occurs, (in/cycle)

TRANSL(1) - approximate value of $\Delta K$ where transition from lower region curve fit to upper region fit occurs, (ksi*sqrt(in))

CKC - plane stress fracture toughness, $K_c$ (ksi*sqrt(in)), used for through crack instability criteria on half-crack length 'c' (room temperature)

AKIC - plane strain fracture toughness, $K_c$ (ksi*sqrt(in)), used for part-through crack instability criteria on crack depth 'a' (room temperature)

SIGMAY - material yield strength (ksi)

VV - material poisson ratio

DELKTH - the threshold of $\Delta K$ (ksi*sqrt(in)), for R = 0 test below which the growth rate is set to zero.

THA - threshold constant, used in definition of variable threshold = $\Delta K_{th}$ (1 - THA ABS(R))

RCUT - the value of the positive stress ratio, R, above which the material does not show accelerated growth rate.

RCUTN - the value of the negative stress ratio, R, below which the material does not show retarded growth rate.

ATP - Are elevated temperature effects accounted for when calculating crack growth? (y/n) if ATP = y

Elevated Temperature Crack Growth Rate Data

(nn = 1 - room temperature (data input above),

nn = 2 - intermediate temperature,

nn = 3 - maximum temperature)

for NN = 2, 3

NBISL(NN) - 0 - single slope curve fit of dc/dN vs. ΔK
1 - bi-slope curve fit of dc/dN vs. ΔK

MATDAT(NN) - name of file containing dc/dN vs. ΔK data for high frequency tests with different R's

ATLEV(NN) - approximate value of dc/dN where transition from lower region curve fit to upper region fit occurs (in/cycle)

TRANSL(NN) - approximate value of ΔK where transition from lower region curve fit to upper region fit occurs (ksi*sqrt(in))

AWL - Are sustained loads accounted for when calculating crack growth? (y/n)

if AWL = y

Wei-Landes Data

FNS - name of file containing dc/dN vs. ΔK data from a low frequency test

FNF - name of file containing dc/dN vs. ΔK data from a high frequency test

RWL - stress ratio for input data

TWL - temperature for this data (degrees Fahrenheit)

ALM - Are elevated temperatures and sustained loads to be accounted for when calculating yield strength? (y/n)

if ALM = y

Larson-Miller Data

FNT - name of file containing temperature vs. yield strength and fracture toughness

FNC - name of file containing Larson-Miller parameters vs. yield strength (accounts for load, hold time, and temp)

Geometry Data

RETTYP - y - Willenborg retardation model used
n - no load interaction
b - analyses is given for both load interaction and no load interaction

RETDA - load interaction shut-off ratio for crack arrest, or overload shut-off ratio

if ATP = y or ALM = y

FNR - name of file containing temperature vs. overload shut-off ratio data

CODE - crack codes

part-through crack types

1010 - center surface crack

1020 - one corner crack from centered open hole

1030 - two corner cracks from centered open hole

1040 - one corner edge crack

through crack types

2010 - center crack

2020 - one crack from centered open hole

2030 - two cracks from centered open hole

2040 - one edge crack

2050 - two edge cracks

2060 - ASTM standard compact tension (ct) specimen

2070 - user defined stress intensity factor

if CODE = 2070

FILECB - stress intensity data file

WIDTH - width of specimen (in)

T - thickness of specimen (in)

RADIUS - radius of open hole (in)

if CODE = 1010, 1020, 1030, or 1040

NBRK - 0 - transition occurs when crack = thickness
1 - transition occurs before crack = thickness

AINIT - initial crack depth (in)

AF1 - final crack depth (in)
0 - critical crack depth

CINIT - initial crack length (in)

DF1 - final crack length (in)

0 - critical crack length

IPS - 0 - plane stress condition is used for crack length

1 - plane strain condition is used for crack length

(plane strain condition is used for crack depth)

Loading Data

NLIM - number of applied test stress levels and/or applied out-of-plane bending moments

maximum # is 6

if RETTYP = b (both retarded and unretarded crack growth is computed), then maximum # is 3

SIGLIM(1-6) - applied limit stress (ksi)

MOMENT(1-6) - out-of-plane bending moment (kip-in) Bending stresses due to out-of-plane bending moments will be calculated and added to the peak and valley axial stresses. The analysis assumes the following:

1) The moments are applied such that the bending stresses are completely reversible (R=-1.0).
2) The loading and moment frequencies are the same.

TITLE - base spectrum title (maximum of 70 characters)

NRP - flag for range pairing each spectrum segment

(Note: A range paired load spectrum is one in which peak and valley loads are re-paired such that the highest peak is paired with the lowest valley, and so on. Typically, this results in a more conservative life estimate.)

0 - no range pair

1 - range pair

(NRP = 0 when doing elevated temp analysis)

ANSP - do you want to use an input file for the spectrum data? (y/n)

if ANSP = y

FILEINS - spectrum input file name

if ANSP = n

for I = 1, 20 (I - mission segment number)

ISPEC(I) - flight spectrum segment type

1 - maximum stress - minimum stress

2 - stress ratio - delta stress

3 - mean stress - alternating stress

4 - end

if ISPEC(I) = 1, 2 or 3

SEGTTL(I) - flight segment description (maximum of 70 characters)

if ATP = n and ALM = n

if ISPEC(I) = 1

$\sigma_{max}$ (ksi), $\sigma_{min}$ (ksi), cycles

- maximum stress, minimum stress, # of cycles
  (enter this data for each load step)

if ISEC(I) = 2

$\Delta\sigma$ (ksi), R, cycles

- delta stress, stress ratio, # of cycles
  (enter this data for each load step)

if ISEC(I) = 3

$\sigma_{mean}$ (ksi), $\sigma_{alt}$ (ksi), cycles

- mean stress, alternating stress, # of cycles
  (enter this data for each load step)

0 0 0 - signifies end of load step input for this segment (I)

if ATP = y or ALM = y

if ISPEC(I) = 1

$\sigma_{max}$ (ksi), $\sigma_{min}$ (ksi), cycles, Temp (°F), $t_c$ (sec), $th_p$ (sec), $th_v$ (sec), $th_z$ (sec)

- maximum stress, minimum stress, # of cycles, temperature, cycle time, hold time at maximum stress level, hold time at minimum stress level, hold time at 0 stress
  (enter this data for each load step)

if ISPEC(I) = 2

$\Delta\sigma$ (ksi), R, cycles, Temp (°F), $t_c$ (sec), $th_p$ (sec), $th_v$ (sec), $th_z$ (sec)

- delta stress, stress ratio, # of cycles, temperature, cycle time, hold time at maximum stress level, hold time at minimum stress level, hold time at 0 stress
  (enter this data for each load step)

if ISPEC(I) = 3

$\sigma_{mean}$ (ksi), $\sigma_{alt}$ (ksi), cycles, Temp (°F),
$t_c$ (sec), $th_p$ (sec), $th_v$ (sec), $th_z$ (sec)

- mean stress, alternating stress, # of cycles, temperature, cycle time, hold time at maximum stress level, hold time at minimum stress level, hold time at 0 stress (enter this data for each load step)

0 0 0 0 0 0 0 0 - signifies end of load step input for this segment (I)

Mission Mix Data

$$\text{Example: Mission} = \text{NBLKS} * \sum_{I=1}^{NMIX} \text{MISMIX}(1,I)*\text{MISMIX}(2,I)$$

NBLKS = # of times the complete mission string is repeated

NMIX = # of mission segments to be summed

for I = 1, NMIX

MISMIX(1,I) = # of times individual mission is repeated

MISMIX(2,I) = mission segment number

<u>Output Options</u>

ICFH - 1 - print output in cycles

2 - print output in flights

3 - print output in hours

NFPB - number of cycles (or flights or hours) per block

ANE1 - Should spectrum be printed in the output? (y/n)

NB - print crack growth history data in increments of NB cycles (or flights or hours)

ANE2 - Is plotting required? (y/n)

if ANE2 = y

ANE3(1) - Do you want to plot c vs. N? (y/n)

ANE3(2) - Do you want to plot dc/dN vs. N? (y/n)

ANE3(3) - Do you want to plot dc/dN vs. c? (y/n)
ANE3(4) - Do you want to plot dc/dN vs. $K_{max}$? (y/n)
for I - 1, 4
  if ANE3(I) = y
    SCALE(1,I) - linear or log grid for x axis
    SCALE(2,I) - linear or log grid for y axis
      0 - linear
      1 - log

c. <u>Format for Material and Loading Data Files</u> - There are several material data files which must be included in the input file. These data files describe: 1) crack growth at various temperatures, 2) sustained load effects on crack growth, 3) the effects of temperature on yield strength, fracture toughness, and overload shut-off ratio, 4) the effect of temperature and hold time at load on the effective yield strength, and 5) a user defined stress intensity field. The data file names must not be longer than 10 characters. The format for these files is described below.

MATDAT(1) - room temperature crack growth data
MATDAT(2) - intermediate crack growth data
MATDAT(3) - maximum temperature crack growth data

Three separate data files must be created, each with the following format:

line 1) title (maximum of 70 characters)
line 2) number of points, stress ratio, temperature (°F)
line 3) $\Delta K_i$ (ksi*sqrt(in)), $dc/dN_i$ (in/cycle) - for i = 1, number of points

This format is repeated in each temperature file for any additional data run at different stress ratios. The first set of data in the file must be from an R=0 (or at least no higher than R=0.1) test.

FNS - low frequency crack growth data (Wei-Landes method)
FNF - high frequency crack growth data (Wei-Landes method)

Two separate data files are required with the following format:

line 1) title (maximum of 70 characters)

line 2) number of points, total cycle time (sec), hold time at maximum load (sec)

line 3) $\Delta K_i$ (ksi*sqrt(in)), $dc/dN_i$ (in/cycle) - for i = 1, number of points

FNT - temperature effects on yield strength and fracture toughness data file format:

line 1) title (maximum of 70 characters)

line 2) number of points

line 3) temperature (°F), % room temperature yield strength, % room temperature fracture toughness

line 4) . , . . , . - for i = 1, number of points

FNC - temperature and hold time effects on the effective yield strength (creep model - Larson-Miller data) format:

line 1) title (maximum of 70 characters)

line 2) number of points, Larson-Miller coefficient

line 3) Larson-Miller parameter, % room temperature yield strength,

line 4) . , . . , . - for i = 1, number of points

Note: Larson-Miller parameter, $P = (460 + T)(P_{lm} + \log(t_h))\ 10^{-3}$

T is the temperature in degrees Fahrenheit, $t_h$ is the hold time in hours, and $P_{lm}$ is the Larson-Miller coefficient which is a material property.

FNR - temperature effect on overload shut-off ratio data file format:

line 1) title (maximum of 70 characters)

line 2) number of points

line 3) temperature (°F), % room temperature overload shut-off ratio

line 4) . , . . , . - for i = 1, number of points

FILECB - user defined stress intensity factor data format:

line 1) title (maximum of 70 characters)
line 2) number of points
line 3) crack length (in), geometry factor ($\beta$)
line 4) . , . , . - for i = 1, number of points

Note: The stress intensity factor is defined as:

$$K = (\sigma_t \beta_t + \sigma_b \beta_b) (\pi c)^{1/2}$$

Two sets of data must be included in this file. The first set is for a plate loaded in tension and the second set for a plate subject to out-of-plane bending moments. If only one set of data is provided, then the number of points for the other set must be set equal to zero.

The load (and temperature) spectrum can be placed directly in the main input file as described in the previous section. However, this data may also be kept in a separate file, *FILEINS, if desired.* The format for this file is exactly the same as shown in the input data description when ANSP = n.

2. Output Results - The user has the option of running DAMAGE in interactive or batch mode. Either way, during program execution the output is written to a file called DAMAGE.DAT in the user's directory. The output is displayed on the screen during an interactive session. The output is displayed in four sections: 1) data echo, 2) critical crack length data, 3) crack growth data, and 4) plots. The output displayed and the files created by each module are described in this section.

a. Data Echo - All of the input data is echoed in the first part of the output data file. This allows a visual check of the input data. The data is listed along with a brief description of each variable. The user also has the option of printing the equations used for calculating the stress intensity factors in the output file. In addition, the load and temperature data file will be displayed if desired. This is especially convenient when the load spectrum has been ranged paired.

b. Critical Crack Length - The critical crack length (and depth for panels with part-through thickness flaws) is based on the peak stress in the load spectrum and the fracture toughness of the material. The program uses an iterative procedure in which the fracture toughness is calculated based on an initial guess for the critical crack length. This guess is then increased or decreased depending on whether the calculated fracture toughness is greater than or less than the actual material fracture toughness. The iterative procedure is complete when the error in the calculated fracture toughness is less than 1.0 percent.

Temperature affects the material fracture toughness, and therefore, the critical crack length. The critical crack length is recalculated for each temperature input in the fracture toughness data.

The output file (DAMAGE.DAT) identifies the maximum axial and bending stress in the load spectrum. Then, at each temperature, the following items are listed: 1) the critical crack length, 2) the calculated fracture toughness, and 3) the number of iterations required to achieve less than a 1.0 percent error. Panels with part-through thickness flaws also list the same information for the critical crack length as well as similar information for the critical crack depth.

c. Crack Growth Data - Crack length (and depth for panels with part-through thickness flaws) is printed at intervals specified by the user. Life can be expressed in terms of cycles, flights, or hours. The maximum stress intensity factor and the crack growth rate are also supplied at each interval. The crack growth rate is expressed in terms of inches/cycle.

d. Plotting Capabilities - DAMAGE also contains a subroutine for producing low resolution plots on any terminal. Therefore a quick graphical reference can be made for the output crack growth data. Four types of plots can be made: 1) crack length vs. life, 2) crack growth rate vs. life, 3) crack growth rate vs. crack length, and 4) crack growth rate vs. maximum stress intensity. These plots are applicable for part-through and through thickness flaws. Four additional plots describing the crack depth are also available for panels with part-through thickness flaws. The x and y axes can be plotted on a linear or logrithmic scale as specified by the user.

A maximum of six curves (one for each stress level) may be plotted per graph. The plot legend identifies the stress level with the appropriate curve symbol. Next to each stress level, an "R" or a "U" will appear, indicating whether the solution included load retardation (R) effects due to overloads or if the solution was unretarded (U).

The data generated by the plotting module are also written to data files in a format which allows for plotting using higher resolution routines. All of the output files are written to the user's directory during execution. The data file names are PLOT*.DT, where the * will be 1 through 8 for the 8 different plots available.

# SECTION IV

## EXAMPLE PROBLEMS

Data may be input into the program interactively or using input files. If the data is input interactively, the program will store the data in an input file, if the user desires.

Four different example problems are listed in this section to demonstrate the input file format and to display some sample output. The data in the input files must appear on the appropriate lines as shown, but the column spacing in each row is arbitrary. If there is an error in the input file, the program will terminate execution. Therefore, the simplest way to create an input file is to enter the data interactively and let the program create and save the input file for later use.

Material data and spectrum load data files specified in the input files below are listed in Appendices B, C, and D.

Example 1. Room Temperature, Constant Amplitude Load

Material: Inconel 718

Specimen Type: Center Cracked Tension - Through Thickness

Load Profile: Constant Amplitude, R=0.02

Temperature Profile: Constant Temperature, 78°F

Input File

```
Model Development
IN-718
0
IN718RT2          (Appendix B)
0.0000000E+00
0.0000000E+00
120.00000
120.00000
164.0000
0.29
11.0000
0.2620
1.250000
-0.200
N
N
N
Y
2.40
2010
3.000000
0.1870000
0.0000000E+00
0.410
0.0000000E+00
0
1
15.84
0.00
Constant Amplitude
0
N
1
R = 0.02
1.00  0.020  100.0
1.00  0.020  100.0
1.00  0.020  100.0
```

```
1.00  0.020  100.0
1.00  0.020  100.0
1.00  0.020  100.0
1.00  0.020  100.0
1.00  0.020  100.0
1.00  0.020  100.0
1.00  0.020  100.0
0 0 0
4
1000
1
1
1
1
1000
N
10000
Y
Y
N
N
Y
0
0
1
1
```

Output File

```
                     D A M A G E
DAMAGE ANALYSIS OF METALS SUBJECT TO AGGRESSIVE ENVIRONMENTS

Model Development

CRACK CODE:   2010 --- THROUGH CRACK, CENTERED
LOAD INTERACTION:  WILLENBORG-CHANG
DAMAGE ACCUMULATION:    VROMAN (LINEAR APPRX.)
CRACK GROWTH RATE EQ.:  MODIFIED WALKER

MATERIAL:  IN-718

ROOM TEMPERATURE CRACK GROWTH RATE DATA
DC/DN VS DELTA K MATERIAL FILE -   IN718RT2
TEMPERATURE =           78.000
        WALKER EQUATION VARIABLES

GROWTH RATE EQ. CONST. C = 2.2556E-12
GROWTH RATE EQ. EXP.   N = 4.280
GROWTH RATE EQ. EXP.   M = 0.596
GROWTH RATE EX. EXP.   Q = 1.009

ROOM TEMPERATURE FRACTURE TOUGHNESS - PLANE STRAIN = 120.000
ROOM TEMPERATURE FRACTURE TOUGHNESS - PLANE STRESS = 120.00
ROOM TEMPERATURE YIELD STRENGTH = 164.000 KSI
POISSON RATIO =                   0.29
DELTA KTH = (1 -  0.3*ABS(R))*  11.000
+R CUT-OFF =                     1.250
-R CUT-OFF =                    -0.200
HALF PLATE WIDTH (B) =           1.500 INCH
PLATE THICKNESS (T)  =           0.187 INCH
INITIAL HALF CRACK LENGTH (C) =  0.410 INCH
FINAL HALF CRACK LENGTH (C)   =  0.000 INCH
PLANE STRESS PROBLEM
M I S S I O N  M I X

MAXIMUM NUMBER OF LOAD BLOCKS =   1000
THE LOADING SPECTRUM HAS      1 MISSION(S)
DESIGN LIMIT STRESS
        15.840 KSI
OUT-OF-PLANE BENDING MOMENT
         0.000 KIP-IN

**********  END OF INPUT  **********
```

D A M A G E

DAMAGE ANALYSIS OF METALS SUBJECT TO AGGRESSIVE ENVIRONMENTS

Model Development

ESTIMATION OF THE CRITICAL CRACK LENGTH
BASED ON KLIMIT AND CONSTANT ASPECT RATIO

MAXIMUM STRESS = DESIGN LIMIT STRESS * MAXIMUM PEAK IN SPECTRUM
MAXIMUM AXIAL STRESS = 15.840 * 1.000 = 15.84 KSI
MAXIMUM BENDING STRESS = 0.00 KSI

| TEMP | CRACK LENGTH | STRESS INTENSITY | ITERATION |
|---|---|---|---|
| 78.0 | 1.425 | 120.00 | 14 |

CRITICAL CRACK SIZE ESTIMATE COMPLETED

D A M A G E
DAMAGE ANALYSIS OF METALS SUBJECT TO AGGRESSIVE ENVIRONMENTS

Model Development

ANALYSIS IS DONE WITH LOAD INTERACTION.
CRACK GROWTH SUMMARY TABLE FOR EVERY 10000 LOAD CYCLES
INITIAL CRACK LENGTH WAS C = 0.4100 IN
DESIGN LIMIT STRESS = 15.84 KSI
BENDING MOMENT = 0.00 KIP-IN

| LOAD CYCLES | LENGTH | KMAX | DC/DN |
|---|---|---|---|
| 10000. | 0.4163 | 19.03 | 6.407E-07 |
| 20000. | 0.4228 | 19.21 | 6.670E-07 |
| 30000. | 0.4296 | 19.39 | 6.953E-07 |
| 40000. | 0.4367 | 19.59 | 7.257E-07 |
| 50000. | 0.4442 | 19.79 | 7.586E-07 |
| 60000. | 0.4519 | 20.01 | 7.942E-07 |
| 70000. | 0.4601 | 20.23 | 8.329E-07 |
| 80000. | 0.4686 | 20.46 | 8.751E-07 |
| 90000. | 0.4776 | 20.71 | 9.214E-07 |
| 100000. | 0.4870 | 20.97 | 9.722E-07 |
| 110000. | 0.4970 | 21.25 | 1.028E-06 |
| 120000. | 0.5076 | 21.55 | 1.091E-06 |
| 130000. | 0.5189 | 21.86 | 1.160E-06 |
| 140000. | 0.5309 | 22.20 | 1.239E-06 |
| 150000. | 0.5437 | 22.56 | 1.328E-06 |
| 160000. | 0.5575 | 22.95 | 1.429E-06 |
| 170000. | 0.5724 | 23.38 | 1.546E-06 |
| 180000. | 0.5885 | 23.84 | 1.682E-06 |
| 190000. | 0.6061 | 24.36 | 1.843E-06 |
| 200000. | 0.6255 | 24.93 | 2.037E-06 |
| 210000. | 0.6470 | 25.58 | 2.275E-06 |
| 220000. | 0.6712 | 26.33 | 2.573E-06 |
| 230000. | 0.6988 | 27.21 | 2.959E-06 |
| 240000. | 0.7309 | 28.26 | 3.482E-06 |
| 250000. | 0.7692 | 29.59 | 4.232E-06 |
| 260000. | 0.8170 | 31.34 | 5.410E-06 |
| 270000. | 0.8808 | 33.90 | 7.568E-06 |
| 280000. | 0.9789 | 38.56 | 1.308E-05 |
| 290000. | 1.2831 | 67.02 | 1.226E-04 |
| 290491. | 1.4385 | 132.76 | 1.643E-03 |

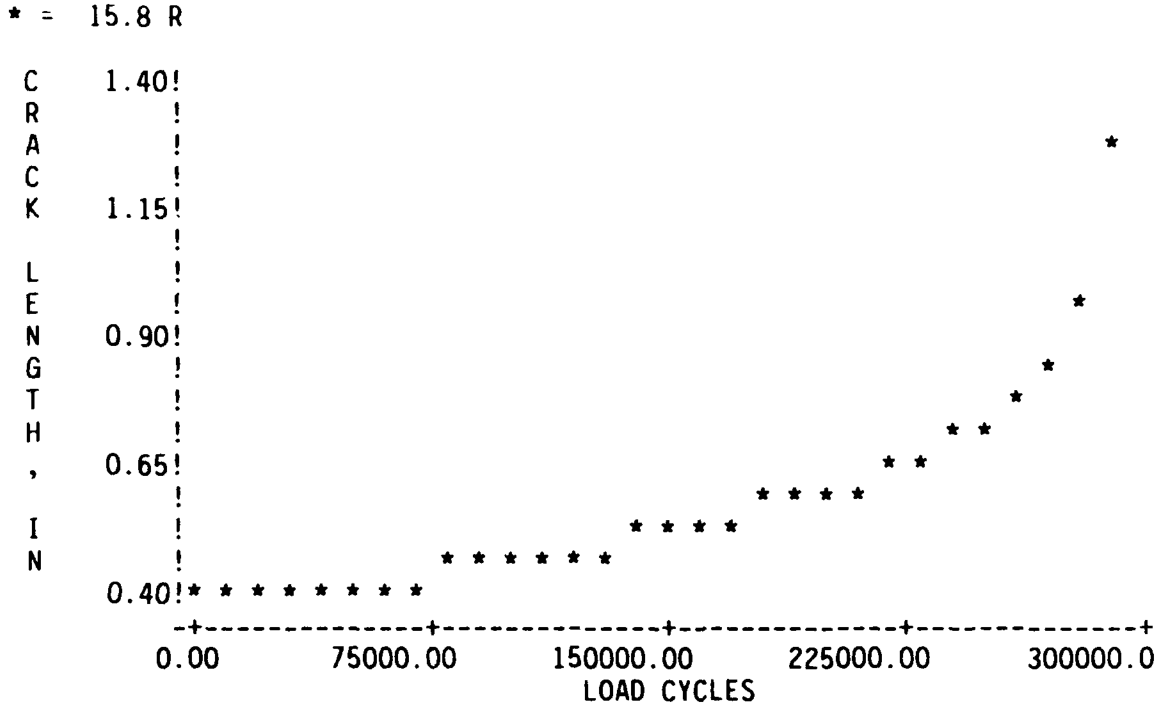
CRACK GROWTH ANALYSIS COMPLETE
CRITICAL STRESS INTENSITY EXCEEDED - KC = 120.00
MAXIMUM CRACK LENGTH EXCEEDED - CF = 1.4254
TOTAL TEST TIME = 0.0 HOURS
AVERAGE TEST TEMPERATURE = 78.0

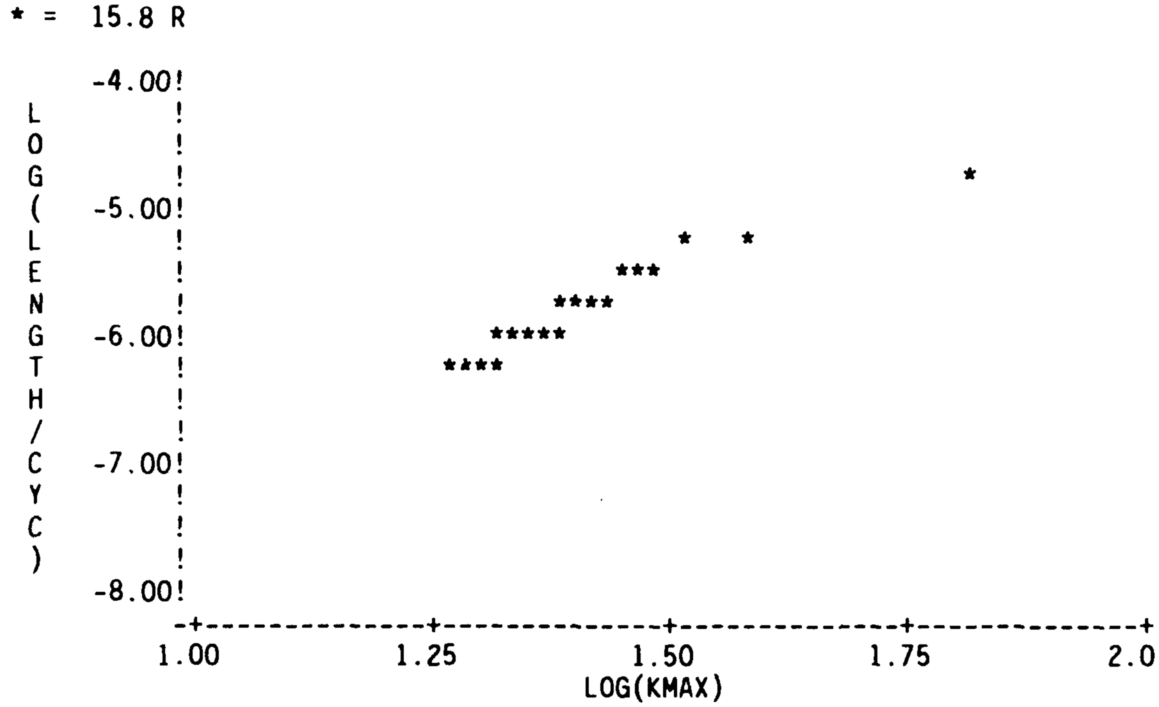
```
FINAL CRACK SIZE WAS REACHED
IN BLOCK    291     STEP      4
WITH C =    1.439
CRACK GROWTH HISTORY COMPLETED

* * *  P L O T   S U M M A R Y  * * *

Model Development
PLOT 1  LINEAR               CRACK LENGTH, IN VS             LOAD CYCLES
PLOT 2  LOG-LOG                LENGTH/CYCLE   VS       KMAX, KSI*SQRT(IN)
```

D A M A G E
DAMAGE ANALYSIS OF METALS SUBJECT TO AGGRESSIVE ENVIRONMENTS



Example 2. Room Temperature, Spectrum Load

Material: 6-2-4-2 Titanium
Specimen Type: Center Cracked Tension - Part-Through Thickness
Load Profile: Spectrum Load, Aerospace Vehicle
Temperature Profile: Constant Temperature, 78$^{O}$F

Input File

```
Model Development
Ti-6-2-4-2
1
TI6242RT2           (Appendix B)
2.0000000E-06
15.00000
60.00000
60.00000
139.6000
0.32
9.000000
0.8800000
1.250000
-0.3000
N
N
N
Y
2.00
1010
3.000000
0.1870000
0.0000000E+00
0
0.1000
0.0000000E+00
0.3015
0.0000000E+00
0
1
35.00
0.00
Aerospace Vehicle Load Spectrum
0
Y
APTI                (Appendix D)
1000
1
1
1
3
```

```
50
N
100
N
```

Output File

```
                          D A M A G E
DAMAGE ANALYSIS OF METALS SUBJECT TO AGGRESSIVE ENVIRONMENTS

Model Development

CRACK CODE:  1010 --- SURFACE CRACK, CENTERED
LOAD INTERACTION:  WILLENBORG-CHANG
DAMAGE ACCUMULATION:    VROMAN (LINEAR APPRX.)
CRACK GROWTH RATE EQ.:  MODIFIED WALKER

MATERIAL:  Ti-6-2-4-2

ROOM TEMPERATURE CRACK GROWTH RATE DATA
DC/DN VS DELTA K MATERIAL FILE - ti6242RT2
TEMPERATURE =           78.000
        WALKER EQUATION VARIABLES

REGION  I
GROWTH RATE EQ. CONST. C = 1.1493E-12
GROWTH RATE EQ. EXP.   N = 5.566
GROWTH RATE EQ. EXP.   M = 0.529
GROWTH RATE EX. EXP.   Q = 1.000

REGION  II
GROWTH RATE EQ. CONST. C = 1.0593E-11
GROWTH RATE EQ. EXP.   N = 4.689
GROWTH RATE EQ. EXP.   M = 0.618
GROWTH RATE EX. EXP.   Q = 1.982

REGION I - REGION II TRANSITION AT DC/DN = 1.5334E-06
                                DELTA K =      12.605


ROOM TEMPERATURE FRACTURE TOUGHNESS - PLANE STRAIN = 60.000
ROOM TEMPERATURE FRACTURE TOUGHNESS - PLANE STRESS = 60.00
ROOM TEMPERATURE YIELD STRENGTH = 139.600 KSI
POISSON RATIO =                   0.32
DELTA KTH = (1 -  0.9*ABS(R))*    9.000
+R CUT-OFF =                      1.250
-R CUT-OFF =                     -0.300
HALF PLATE WIDTH (B) =            1.500 INCH
PLATE THICKNESS (T)  =            0.187 INCH
INITIAL HALF CRACK LENGTH (C) =   0.301 INCH
INITIAL CRACK DEPTH (A) =         0.100 INCH
FINAL HALF CRACK LENGTH (C)    =  0.000 INCH
FINAL CRACK DEPTH (A)          =  0.000 INCH
```

```
A/C RATIO =                            0.332
PLANE STRESS PROBLEM
M I S S I O N  M I X

MAXIMUM NUMBER OF LOAD BLOCKS =    1000
THE LOADING SPECTRUM HAS       1 MISSION(S)
DESIGN LIMIT STRESS
        35.000 KSI
OUT-OF-PLANE BENDING MOMENT
         0.000 KIP-IN

**********  END OF INPUT  **********
```

D A M A G E

DAMAGE ANALYSIS OF METALS SUBJECT TO AGGRESSIVE ENVIRONMENTS

Model Development

ESTIMATION OF THE CRITICAL CRACK LENGTH
BASED ON KLIMIT AND CONSTANT ASPECT RATIO

MAXIMUM STRESS = DESIGN LIMIT STRESS * MAXIMUM PEAK IN SPECTRUM
MAXIMUM AXIAL STRESS = 35.000 * 1.000 = 35.00 KSI
MAXIMUM BENDING STRESS = 0.00 KSI

| TEMP | CRACK DEPTH | STRESS INTENSITY | ITERATION | CRACK LENGTH | STRESS INTENSITY | ITERATION |
|---|---|---|---|---|---|---|
| 78.0 | 0.187 | 45.38 | 2 | 0.697 | 60.01 | 13 |

CRITICAL CRACK SIZE ESTIMATE COMPLETED

D A M A G E

DAMAGE ANALYSIS OF METALS SUBJECT TO AGGRESSIVE ENVIRONMENTS

Model Development

ANALYSIS IS DONE WITH LOAD INTERACTION.
CRACK GROWTH SUMMARY TABLE FOR EVERY 100 FLIGHT HOURS
INITIAL CRACK DEPTH WAS A = 0.1000 IN
INITIAL CRACK LENGTH WAS C = 0.3015 IN
DESIGN LIMIT STRESS = 35.00 KSI
BENDING MOMENT = 0.00 KIP-IN

| FLIGHT HOURS | LENGTH | KMAX | DC/DN | DEPTH | KMAX | DA/DN |
|---|---|---|---|---|---|---|
| 100. | 0.3019 | 12.67 | 8.157E-07 | 0.1033 | 18.03 | 1.061E-05 |
| 200. | 0.3023 | 13.11 | 9.652E-07 | 0.1069 | 18.33 | 1.153E-05 |
| 300. | 0.3028 | 13.59 | 1.153E-06 | 0.1109 | 18.64 | 1.254E-05 |
| 400. | 0.3035 | 14.10 | 1.390E-06 | 0.1151 | 18.96 | 1.367E-05 |
| 500. | 0.3042 | 14.65 | 2.511E-06 | 0.1197 | 19.28 | 1.492E-05 |
| 600. | 0.3053 | 15.25 | 3.098E-06 | 0.1247 | 19.61 | 1.631E-05 |
| 700. | 0.3068 | 15.89 | 3.743E-06 | 0.1302 | 19.95 | 1.782E-05 |
| 800. | 0.3086 | 16.58 | 4.565E-06 | 0.1361 | 20.29 | 1.946E-05 |
| 900. | 0.3107 | 17.31 | 5.606E-06 | 0.1425 | 20.62 | 2.109E-05 |
| 1000. | 0.3133 | 18.08 | 6.929E-06 | 0.1493 | 20.94 | 2.272E-05 |
| 1100. | 0.3165 | 18.89 | 8.637E-06 | 0.1567 | 21.24 | 2.435E-05 |
| 1200. | 0.3204 | 19.72 | 1.083E-05 | 0.1646 | 21.51 | 2.592E-05 |
| 1300. | 0.3252 | 20.57 | 1.359E-05 | 0.1730 | 21.75 | 2.738E-05 |
| 1400. | 0.3309 | 21.42 | 1.699E-05 | 0.1819 | 21.95 | 2.863E-05 |

TRANSISTION TO THRU CRACK
MAXIMUM CRACK DEPTH EXCEEDED - AF = 0.1868

| | | | |
|---|---|---|---|
| 1500. | 0.3425 | 16.96 | 2.085E-06 |
| 1600. | 0.3624 | 17.52 | 2.436E-06 |
| 1700. | 0.3869 | 18.19 | 2.924E-06 |
| 1800. | 0.4169 | 19.02 | 3.629E-06 |
| 1900. | 0.4553 | 20.07 | 4.735E-06 |
| 2000. | 0.5076 | 21.52 | 6.624E-06 |
| 2100. | 0.5874 | 23.78 | 1.085E-05 |
| 2200. | 0.7590 | 29.19 | 3.085E-05 |
| 2203. | 0.7695 | 65.39 | 3.276E-05 |

CRACK GROWTH ANALYSIS COMPLETE
CRITICAL STRESS INTENSITY EXCEEDED - KC = 60.00
MAXIMUM CRACK LENGTH EXCEEDED - CF = 0.6972
TOTAL TEST TIME = 0.0 HOURS
AVERAGE TEST TEMPERATURE = 78.0

FINAL CRACK SIZE WAS REACHED
IN BLOCK 45 STEP 76
WITH C = 0.769
CRACK GROWTH HISTORY COMPLETED

Example 3. Elevated Temperature, Constant Amplitude Load

Material: Inconel 718
Specimen Type: Center Cracked Tension - Through-Thickness
Load Profile: Constant Amplitude, R=-0.20, 30 Second Hold
Times at Peak Load
Temperature Profile: Constant Temperature, 1200$^0$F

Input File

```
Model Development
IN-718
0
IN718RT2            (Appendix B)
0.0000000E+00
0.0000000E+00
120.00000
120.00000
164.0000
0.29
12.20000
0.2620
1.250000
-0.200
Y
0
IN718700B           (Appendix B)
0.0
0.0
0
IN718TP             (Appendix B)
0.0
0.0
N
Y
DAMINYDKC           (Appendix B)
DAMINEFYD           (Appendix B)
y
2.400
DAMINRSO            (Appendix B)
2010
3.000000
0.1870000
0.0000000E+00
0.903
0.0000000E+00
0
1
19.443
0.00
```

```
Constant Amplitude
 0
 N
 1
 R = -0.20
 1.00  -0.20  10.0  1200.0  31.25  30.0
 1.00  -0.20  10.0  1200.0  31.25  30.0
 1.00  -0.20  10.0  1200.0  31.25  30.0
 1.00  -0.20  10.0  1200.0  31.25  30.0
 1.00  -0.20  10.0  1200.0  31.25  30.0
 1.00  -0.20  10.0  1200.0  31.25  30.0
 1.00  -0.20  10.0  1200.0  31.25  30.0
 1.00  -0.20  10.0  1200.0  31.25  30.0
 1.00  -0.20  10.0  1200.0  31.25  30.0
 1.00  -0.20  10.0  1200.0  31.25  30.0
 0 0 0 0 0 0 0 0
 4
 1000
 1
 1
 1
 1
 100
 Y
 100
 N
```

Output File

```
                          D A M A G E
 DAMAGE ANALYSIS OF METALS SUBJECT TO AGGRESSIVE ENVIRONMENTS

 Model Development

 CRACK CODE:   2010 --- THROUGH CRACK, CENTERED
 LOAD INTERACTION:  WILLENBORG-CHANG
 DAMAGE ACCUMULATION:    VROMAN (LINEAR APPRX.)
 CRACK GROWTH RATE EQ.:  MODIFIED WALKER
 TEMP EFFECTS ON YIELD STRENGTH: LARSON-MILLER DATA
 TEMP EFFECTS ON FRACTURE TOUGHNESS: TEST DATA
  NO RANGE PAIR COUNTING ALLOWED WHEN APPLYING ELEVATED TEMPERATURES

 MATERIAL:  IN-718

 ROOM TEMPERATURE CRACK GROWTH RATE DATA
 DC/DN VS DELTA K MATERIAL FILE -   IN718RT
 TEMPERATURE =           78.000
         WALKER EQUATION VARIABLES

 GROWTH RATE EQ. CONST. C = 2.2556E-12
 GROWTH RATE EQ. EXP.   N = 4.280
 GROWTH RATE EQ. EXP.   M = 0.596
 GROWTH RATE EX. EXP.   Q = 1.009
```

```
ROOM TEMPERATURE FRACTURE TOUGHNESS - PLANE STRAIN = 120.000
ROOM TEMPERATURE FRACTURE TOUGHNESS - PLANE STRESS = 120.000
ROOM TEMPERATURE YIELD STRENGTH = 164.000 KSI
POISSON RATIO =                   0.29
DELTA KTH = (1 -  0.3*ABS(R))*  12.200
+R CUT-OFF =                     1.250
-R CUT-OFF =                    -0.200

MATERIAL:  IN-718

INTERMEDIATE TEMPERATURE CRACK GROWTH RATE DATA
DC/DN VS DELTA K MATERIAL FILE - in718700B
TEMPERATURE =          700.000
        WALKER EQUATION VARIABLES

GROWTH RATE EQ. CONST. C = 6.8572E-11
GROWTH RATE EQ. EXP.   N = 3.269
GROWTH RATE EQ. EXP.   M = 1.000
GROWTH RATE EX. EXP.   Q = 1.000


MATERIAL:  IN-718

MAXIMUM TEMPERATURE CRACK GROWTH RATE DATA
DC/DN VS DELTA K MATERIAL FILE - in718tp
TEMPERATURE =         1200.000
        WALKER EQUATION VARIABLES

GROWTH RATE EQ. CONST. C = 1.4059E-09
GROWTH RATE EQ. EXP.   N = 2.855
GROWTH RATE EQ. EXP.   M = 0.941
GROWTH RATE EX. EXP.   Q = 1.000

TEMPERATURE VS YIELD STRENGTH AND KC DATA FILE - daminydkc
TEMPERATURE AND HOLD TIME VS EFF YIELD STR FILE - daminefyd
HALF PLATE WIDTH (B) =           1.500 INCH
PLATE THICKNESS (T)  =           0.187 INCH
INITIAL HALF CRACK LENGTH (C) =  0.903 INCH
FINAL HALF CRACK LENGTH (C)   =  0.000 INCH
PLANE STRESS PROBLEM
M I S S I O N  M I X

MAXIMUM NUMBER OF LOAD BLOCKS =   1000
THE LOADING SPECTRUM HAS      1 MISSION(S)
DESIGN LIMIT STRESS
        19.443 KSI
OUT-OF-PLANE BENDING MOMENT
         0.000 KIP-IN
```

SPECTRUM FOR SEGMENT 1

R = -0.20

| STEP # | MAX. STR | MIN. STR | CYCLES | TEMP | LOAD CY TIME | HOLD TM @ PEAK | HOLD TM @ VALL | HOLD TM @ ZERO |
|---|---|---|---|---|---|---|---|---|
| 1 | 1.00 | -0.20 | 10. | 1200. | 31.3 | 30.0 | 0.0 | 0.0 |
| 2 | 1.00 | -0.20 | 10. | 1200. | 31.3 | 30.0 | 0.0 | 0.0 |
| 3 | 1.00 | -0.20 | 10. | 1200. | 31.3 | 30.0 | 0.0 | 0.0 |
| 4 | 1.00 | -0.20 | 10. | 1200. | 31.3 | 30.0 | 0.0 | 0.0 |
| 5 | 1.00 | -0.20 | 10. | 1200. | 31.3 | 30.0 | 0.0 | 0.0 |
| 6 | 1.00 | -0.20 | 10. | 1200. | 31.3 | 30.0 | 0.0 | 0.0 |
| 7 | 1.00 | -0.20 | 10. | 1200. | 31.3 | 30.0 | 0.0 | 0.0 |
| 8 | 1.00 | -0.20 | 10. | 1200. | 31.3 | 30.0 | 0.0 | 0.0 |
| 9 | 1.00 | -0.20 | 10. | 1200. | 31.3 | 30.0 | 0.0 | 0.0 |
| 10 | 1.00 | -0.20 | 10. | 1200. | 31.3 | 30.0 | 0.0 | 0.0 |

********** END OF INPUT **********

D A M A G E

DAMAGE ANALYSIS OF METALS SUBJECT TO AGGRESSIVE ENVIRONMENTS

Model Development

ESTIMATION OF THE CRITICAL CRACK LENGTH
BASED ON KLIMIT AND CONSTANT ASPECT RATIO

MAXIMUM STRESS = DESIGN LIMIT STRESS * MAXIMUM PEAK IN SPECTRUM
MAXIMUM AXIAL STRESS = 19.443 * 1.000 = 19.44 KSI
MAXIMUM BENDING STRESS = 0.00 KSI

| TEMP | CRACK LENGTH | STRESS INTENSITY | ITERATION |
|---|---|---|---|
| 78.0 | 1.390 | 120.04 | 11 |
| 200.0 | 1.392 | 121.25 | 13 |
| 400.0 | 1.396 | 123.60 | 8 |
| 600.0 | 1.400 | 125.97 | 14 |
| 800.0 | 1.403 | 128.38 | 14 |
| 1000.0 | 1.408 | 132.01 | 14 |
| 1200.0 | 1.411 | 134.40 | 11 |
| 1400.0 | 1.414 | 136.79 | 12 |
| 1600.0 | 1.417 | 139.18 | 14 |

CRITICAL CRACK SIZE ESTIMATE COMPLETED

D A M A G E

DAMAGE ANALYSIS OF METALS SUBJECT TO AGGRESSIVE ENVIRONMENTS

Model Development

ANALYSIS IS DONE WITH LOAD INTERACTION.
CRACK GROWTH SUMMARY TABLE FOR EVERY 100 LOAD CYCLES
INITIAL CRACK LENGTH WAS C = 0.9030 IN
DESIGN LIMIT STRESS = 19.44 KSI
BENDING MOMENT = 0.00 KIP-IN

| LOAD CYCLES | LENGTH | KMAX | DC/DN |
|---|---|---|---|
| 100. | 0.9102 | 43.21 | 7.335E-05 |
| 200. | 0.9177 | 43.62 | 7.538E-05 |
| 300. | 0.9253 | 44.06 | 7.754E-05 |
| 400. | 0.9332 | 44.52 | 7.985E-05 |
| 500. | 0.9413 | 44.99 | 8.231E-05 |
| 600. | 0.9497 | 45.50 | 8.496E-05 |
| 700. | 0.9584 | 46.03 | 8.780E-05 |
| 800. | 0.9673 | 46.59 | 9.087E-05 |
| 900. | 0.9766 | 47.18 | 9.419E-05 |
| 1000. | 0.9862 | 47.81 | 9.780E-05 |
| 1100. | 0.9962 | 48.48 | 1.017E-04 |
| 1200. | 1.0066 | 49.19 | 1.061E-04 |
| 1300. | 1.0175 | 49.96 | 1.108E-04 |
| 1400. | 1.0288 | 50.79 | 1.161E-04 |
| 1500. | 1.0408 | 51.69 | 1.221E-04 |
| 1600. | 1.0533 | 52.67 | 1.288E-04 |
| 1700. | 1.0666 | 53.75 | 1.364E-04 |
| 1800. | 1.0807 | 54.95 | 1.452E-04 |
| 1900. | 1.0958 | 56.29 | 1.554E-04 |
| 2000. | 1.1120 | 57.81 | 1.675E-04 |
| 2100. | 1.1295 | 59.55 | 1.822E-04 |
| 2200. | 1.1487 | 61.59 | 2.003E-04 |
| 2300. | 1.1700 | 64.04 | 2.235E-04 |
| 2400. | 1.1940 | 67.09 | 2.546E-04 |
| 2500. | 1.2217 | 71.06 | 2.989E-04 |
| 2600. | 1.2551 | 76.67 | 3.688E-04 |
| 2700. | 1.2985 | 85.80 | 5.010E-04 |
| 2800. | 1.3657 | 107.58 | 8.990E-04 |
| 2839. | 1.4139 | 136.53 | 1.563E-03 |

CRACK GROWTH ANALYSIS COMPLETE
CRITICAL STRESS INTENSITY EXCEEDED - KC = 134.40
MAXIMUM CRACK LENGTH EXCEEDED - CF = 1.4113
TOTAL TEST TIME = 24.7 HOURS
AVERAGE TEST TEMPERATURE = 1200.0

```
FINAL CRACK SIZE WAS REACHED
IN BLOCK     29     STEP      3
WITH C =   1.414
CRACK GROWTH HISTORY COMPLETED
```

Example 4. Spectrum Temperature, Spectrum Load -

Material: 6-2-4-2 Titanium
Specimen Type: Open Hole Tension - Through-Thickness
Load Profile: Spectrum Load, Advanced Fighter,
Time Compression Factor = 100
Temperature Profile: Spectrum Temperature,
Maximum Temperature = $1000^{0}$F

Input File

```
Verification Prediction
Ti-6-2-4-2
1
TI6242RT2         (Appendix B)
2.0E-6
15.0
60.00000
60.00000
139.6000
0.32
9.000000
0.8800000
1.250000
-0.300
Y
1
TI6242700         (Appendix B)
1.0E-5
25.0
0
TI6242TP          (Appendix B)
0.0000000E+00
0.0000000E+00
Y
DAMTISLOW         (Appendix B)
DAMTIFAST         (Appendix B)
2.0000000E-02
1000.000
Y
DAMTIYDKC         (Appendix B)
DAMTIEFYD         (Appendix B)
Y
2.00
DAMTIRSO          (Appendix B)
2030
3.000000
0.1870000
0.1250000
```

```
0.350
0.0000000E+00
0
1
29.00000
0.00
Full Advanced Fighter Spectrum
0
y
AF100              (Appendix C)
1000
1
1
1
3
100
N
100
Y
Y
N
N
N
0
0
```

Outpu. File

```
                         D A M A G E
DAMAGE ANALYSIS OF METALS SUBJECT TO AGGRESSIVE ENVIRONMENTS

Verification Prediction

CRACK CODE:  2030 --- TWO THROUGH CRACKS FROM CENTERED OPEN HOLE
LOAD INTERACTION:  WILLENBORG-CHANG
DAMAGE ACCUMULATION:    VROMAN (LINEAR APPRX.)
CRACK GROWTH RATE EQ.:  MODIFIED WALKER
SUSTAINED LOAD EFFECTS:  WEI-LANDES
TEMP EFFECTS ON YIELD STRENGTH: LARSON-MILLER DATA
TEMP EFFECTS ON FRACTURE TOUGHNESS: TEST DATA
 NO RANGE PAIR COUNTING ALLOWED WHEN APPLYING ELEVATED TEMPERATURES
```

MATERIAL: Ti-6-2-4-2

ROOM TEMPERATURE CRACK GROWTH RATE DATA
DC/DN VS DELTA K MATERIAL FILE - ti6242RT2
TEMPERATURE = 78.000
WALKER EQUATION VARIABLES

REGION I

| | |
|---|---|
| GROWTH RATE EQ. CONST. C = | 1.1493E-12 |
| GROWTH RATE EQ. EXP. N = | 5.566 |
| GROWTH RATE EQ. EXP. M = | 0.529 |
| GROWTH RATE EX. EXP. Q = | 1.000 |

REGION II

| | |
|---|---|
| GROWTH RATE EQ. CONST. C = | 1.0593E-11 |
| GROWTH RATE EQ. EXP. N = | 4.689 |
| GROWTH RATE EQ. EXP. M = | 0.618 |
| GROWTH RATE EX. EXP. Q = | 1.982 |

REGION I - REGION II TRANSITION AT DC/DN = 1.5334E-06
DELTA K = 12.605

| | |
|---|---|
| FRACTURE TOUGHNESS - PLANE STRAIN = | 60.000 |
| FRACTURE TOUGHNESS - PLANE STRESS = | 60.000 |
| ROOM TEMPERATURE YIELD STRENGTH = | 139.600 KSI |
| POISSON RATIO = | 0.32 |
| DELTA KTH = (1 - 0.9*ABS(R))* | 9.000 |
| +R CUT-OFF = | 1.250 |
| -R CUT-OFF = | -0.300 |

MATERIAL: Ti-6-2-4-2

INTERMEDIATE TEMPERATURE CRACK GROWTH RATE DATA
DC/DN VS DELTA K MATERIAL FILE - ti6242700
TEMPERATURE = 700.000
WALKER EQUATION VARIABLES

REGION I

| | |
|---|---|
| GROWTH RATE EQ. CONST. C = | 8.7287E-12 |
| GROWTH RATE EQ. EXP. N = | 4.616 |
| GROWTH RATE EQ. EXP. M = | 1.000 |
| GROWTH RATE EX. EXP. Q = | 1.000 |

REGION II

| | |
|---|---|
| GROWTH RATE EQ. CONST. C = | 1.4939E-10 |
| GROWTH RATE EQ. EXP. N = | 3.641 |
| GROWTH RATE EQ. EXP. M = | 1.000 |
| GROWTH RATE EX. EXP. Q = | 1.000 |

REGION I - REGION II TRANSITION AT DC/DN = 6.0088E-06
DELTA K = 18.394

```
MATERIAL:  Ti-6-2-4-2

MAXIMUM TEMPERATURE CRACK GROWTH RATE DATA
DC/DN VS DELTA K MATERIAL FILE - ti6242TP
TEMPERATURE =           1000.000
        WALKER EQUATION VARIABLES

GROWTH RATE EQ. CONST. C =     4.9739E-10
GROWTH RATE EQ. EXP.   N =          3.409
GROWTH RATE EQ. EXP.   M =          0.771
GROWTH RATE EX. EXP.   Q =          1.000

HIGH FREQUENCY DC/DN VS DELTA K DATA FILE - damtifast
LOW  FREQUENCY DC/DN VS DELTA K DATA FILE - damtislow
STRESS RATIO FOR THIS DATA =       0.020
TEMPERATURE FOR THIS DATA =        1000.
TEMPERATURE VS YIELD STRENGTH AND KC DATA FILE - damtiydk
TEMPERATURE AND HOLD TIME VS EFF YIELD STR FILE - damtiefyd
HALF PLATE WIDTH (B) =            1.500 INCH
PLATE THICKNESS (T)  =            0.187 INCH
RADIUS OF HOLE   (R) =  0.125 INCH
INITIAL HALF CRACK LENGTH (C) =  0.350 INCH
FINAL HALF CRACK LENGTH (C)   =  0.000 INCH
PLANE STRESS PROBLEM
M I S S I O N  M I X

MAXIMUM NUMBER OF LOAD BLOCKS =   1000
THE LOADING SPECTRUM HAS      1 MISSION(S)
DESIGN LIMIT STRESS
        29.000 KSI
OUT-OF-PLANE BENDING MOMENT
         0.000 KIP-IN

**********  END OF INPUT  **********
```

D A M A G E

DAMAGE ANALYSIS OF METALS SUBJECT TO AGGRESSIVE ENVIRONMENTS

Verification Prediction

ESTIMATION OF THE CRITICAL CRACK LENGTH
BASED ON KLIMIT AND CONSTANT ASPECT RATIO

MAXIMUM STRESS = DESIGN LIMIT STRESS * MAXIMUM PEAK IN SPECTRUM
MAXIMUM AXIAL STRESS = 29.000 * 1.150 = 33.35 KS
MAXIMUM BENDING STRESS = 0.00 KSI

| TEMP | CRACK LENGTH | STRESS INTENSITY | ITERATION |
|---|---|---|---|
| 78.0 | 0.642 | 59.99 | 13 |
| 200.0 | 0.651 | 60.60 | 12 |
| 300.0 | 0.667 | 61.80 | 13 |
| 400.0 | 0.683 | 63.00 | 13 |
| 500.0 | 0.699 | 64.19 | 12 |
| 600.0 | 0.714 | 65.38 | 10 |
| 700.0 | 0.729 | 66.59 | 12 |
| 800.0 | 0.778 | 70.82 | 10 |
| 900.0 | 0.828 | 75.61 | 11 |
| 1000.0 | 0.867 | 79.81 | 13 |
| 1200.0 | 0.903 | 83.97 | 12 |

CRITICAL CRACK SIZE ESTIMATE COMPLETED

D A M A G E

DAMAGE ANALYSIS OF METALS SUBJECT TO AGGRESSIVE ENVIRONMENTS

Verification Prediction

ANALYSIS IS DONE WITH LOAD INTERACTION.
CRACK GROWTH SUMMARY TABLE FOR EVERY 100 FLIGHT HOURS
INITIAL CRACK LENGTH WAS C = 0.3500 IN
DESIGN LIMIT STRESS = 29.00 KSI
BENDING MOMENT = 0.00 KIP-IN

| FLIGHT HOURS | LENGTH | KMAX | DC/DN |
|---|---|---|---|
| 100. | 0.3750 | 20.63 | 2.493E-07 |
| 200. | 0.4015 | 21.30 | 2.761E-07 |
| 300. | 0.4319 | 22.08 | 3.120E-07 |
| 400. | 0.4674 | 23.02 | 3.633E-07 |
| 500. | 0.5101 | 24.19 | 4.431E-07 |
| 600. | 0.5638 | 25.74 | 5.849E-07 |
| 700. | 0.6359 | 28.01 | 9.085E-07 |
| 752. | 0.6741 | 62.31 | 1.134E-03 |

CRACK GROWTH ANALYSIS COMPLETE
CRITICAL STRESS INTENSITY EXCEEDED - KC = 61.80
MAXIMUM CRACK LENGTH EXCEEDED - CF = 0.6673
TOTAL TEST TIME = 7.5 HOURS
AVERAGE TEST TEMPERATURE = 550.2

FINAL CRACK SIZE WAS REACHED
IN BLOCK 8 STEP 833
WITH C = 0.674
CRACK GROWTH HISTORY COMPLETED

D A M A G E

DAMAGE ANALYSIS OF METALS SUBJECT TO AGGRESSIVE ENVIRONMENTS

```
 * =  29.0 R

C   1.00!
R       !
A       !
C       !
K   0.80!
        !
L       !
E       !
N   0.60!                                                    *
G       !                                             *
T       !                                     *
H       !                              *
,   0.40!               *      *
        !       *
I       !*
N       !
    0.20!
        -+--------------+--------------+--------------+--------------+
        0.00          200.00         400.00         600.00         800.00
                                  FLIGHT HOURS
```

* * *  P L O T  S U M M A R Y  * * *

Verification Prediction

PLOT 1  LINEAR  CRACK LENGTH, IN VS  FLIGHT HOURS

## REFERENCES


1. Harmon, D. M. and Saff, C. R., "Damage Analysis for Manned Hypervelocity Vehicles, Volume I - Final Report," Report No. WRDC-TR-89-3067, September 1989.

2. Chang, J. B., Hiyama, R. M., and Szamossi, M., "Improved Methods for Predicting Spectrum Loading Effects - Final Report, Volume I - Technical Summary," Report No. AFWAL-TR-81-3092, November 1981.

3. Willenborg, J., Engle, R. M., and Wood, H. A., "A Crack Growth Prediction Model Using an Effective Stress Concept," Report No. AFFDL-TM-71-1-FBR, 1971.

4. Gallagher, J. P. and Hughes, T. F., "Influence of Yield Strength on Overload Affected Fatigue Crack Behavior in 4340 Steel," Report No. AFFDL-TR-74-27, March 1974.

5. Larsen, J. M. and Nicholas, T., "Cummulative-Damage Modeling of Fatigue Crack Growth in Turbine Engine Materials," Engineering Fracture Mechanics, Vol. 22, No. 4, pp. 713-730, 1985.

6. Newman, J. C. and Raju, I. S., "Stress Intensity Factor Equations for Cracks in Three Dimensional Finite Bodies Subjected to Tension and Bending Loads," NASA Tech Memorandum 85793, April 1984.

7. Newman, J. C., "Predicting Failure of Specimens With Either Surface Cracks or Corner Cracks at Holes," NASA TN D-8244, June 1976.

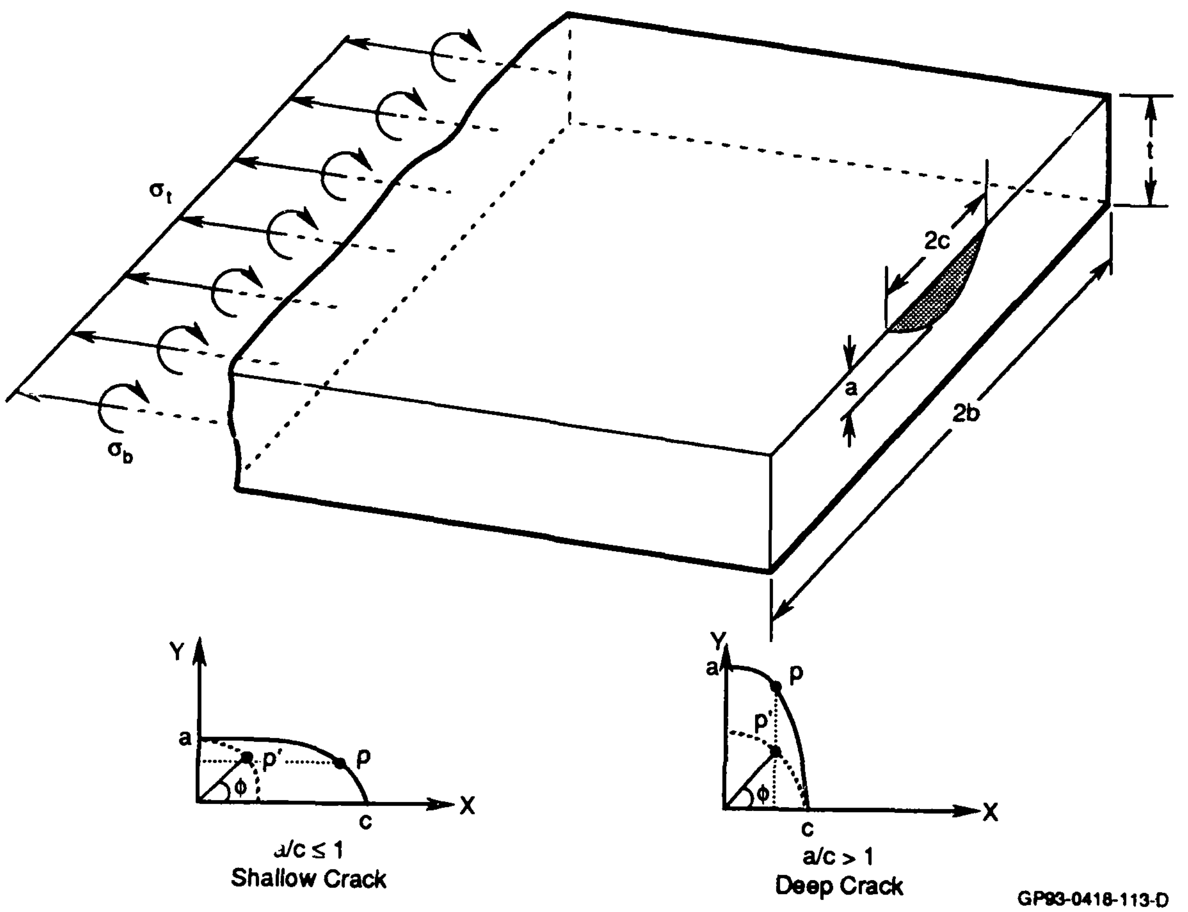
8. Tada, H., Paris, P., and Irwin, G., "The Stress Analysis of Cracks Handbook," Del Research,1973.

9. Rooke, D. P. and Cartwright, D. J., "Compendium of Stress Intensity Factors," 1976.

# APPENDIX A

## STRESS INTENSITY FACTOR LIBRARY

## Crack Code: 1010 - Center Surface Crack




The angle, $\phi$, represents the point along the part-through crack perimeter, P, at which the stress intensity, K, is computed.

To calculate K for the crack depth, a, $\phi$ = 90
To calculate K for the crack length, c, $\phi$ = 10

The point, P, is defined using the following procedure:

1) A circular arc is drawn which is within the crack perimeter and which has a radius equal to "a" for a shallow crack (or "c" for a deep crack);

2) The point along the arc, P', is defined by $\phi$ which is measured from the X axis;

3) A line is drawn parallel to the X axis for a shallow crack (or parallel to the Y axis for a deep crack) through P' to the crack perimeter.

Crack Code: 1010 - Center Surface Crack

Reference: Newman, J. C. and Raju, I. S., "Stress Intensity Factor Equations for Cracks in Three Dimensional Finite Bodies Subjected to Tension and Bending Loads," NASA Tech Memorandum 85793, April 1984.

$$K = K_t(\phi) + K_b(\phi)$$

t - tension, b - bending

$$K_a = K_t(\phi=90^\circ) + K_b(\phi=90^\circ)$$

$$K_c = K_t(\phi=10^\circ) + K_b(\phi=10^\circ)$$

$$K_t(\phi) = \sigma_t \sqrt{\pi \frac{a}{Q}}\, F \qquad K_b(\phi) = \sigma_b \sqrt{\pi \frac{a}{Q}}\, F\, H$$

where

$$Q = 1 + 1.464 \left(\frac{a}{c}\right)^{1.65} \quad \text{for } \frac{a}{c} \le 1$$

$$Q = 1 + 1.464 \left(\frac{c}{a}\right)^{1.65} \quad \text{for } \frac{a}{c} > 1$$

$$F = m\, g\, f_\phi\, f_w$$

$$H = H_1 + (H_2 - H_1) \sin^p \phi$$

$$f_w = \sqrt{\sec\left(\frac{\pi c}{2b}\sqrt{\frac{a}{t}}\right)}$$

for $a/c \leq 1$ (shallow crack)

$$m = (1.13-0.09\, a/c) + \left(-0.54 + \frac{0.89}{0.2+a/c}\right)\left(\frac{a}{t}\right)^2 + \left(0.5 - \frac{1}{0.65+a/c} + 14(1-a/c)^{24}\right)\left(\frac{a}{t}\right)^4$$

$$g = 1 + \left[0.1 + 0.35\left(\frac{a}{t}\right)^2\right](1 - \sin\phi)^2$$

$$f_\phi = \left[\left(\frac{a}{c}\right)^2 \cos^2\phi + \sin^2\phi\right]^{1/4}$$

$$H_1 = 1 - 0.34\frac{a}{t} - 0.11\frac{a}{c}\frac{a}{t}$$

$$H_2 = 1 - \left(1.22+0.12\frac{a}{c}\right)\frac{a}{t} + \left[0.55-1.05\left(\frac{a}{c}\right)^{3/4}+0.47\left(\frac{a}{c}\right)^{3/2}\right]\left(\frac{a}{t}\right)^2$$

$$p = 0.2 + a/c + 0.6\, a/t$$

for a/c > 1 (deep surface crack)

$$m = \sqrt{\frac{c}{a}}\left(1+0.04\,\frac{c}{a}\right) + 0.2\,\left(\frac{c}{a}\right)^4\left(\frac{a}{t}\right)^2 - 0.11\,\left(\frac{c}{a}\right)^4\left(\frac{a}{t}\right)^4$$

$$g = 1 + \left[0.1 + 0.35\,\frac{c}{a}\,\left(\frac{a}{t}\right)^2\right]\,(1 - \sin\phi)^2$$

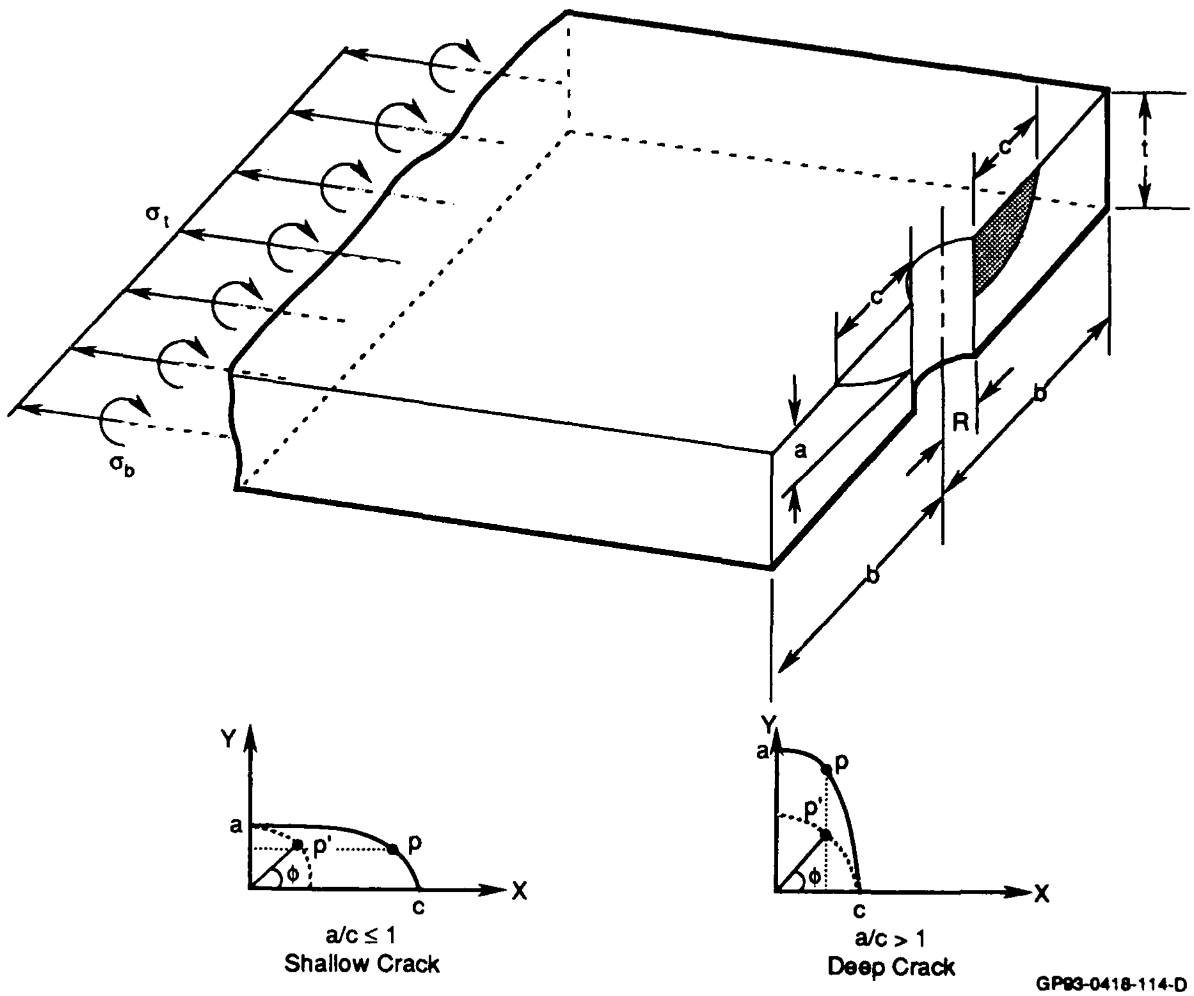
$$f_\phi = \left[\left(\frac{c}{a}\right)^2 \sin^2\phi + \cos^2\phi\right]^{1/4}$$

$$H_1 = 1 - \left(0.04+0.41\,\frac{c}{a}\right)\frac{a}{t} + \left[0.55-1.93\left(\frac{c}{a}\right)^{3/4}+1.38\left(\frac{c}{a}\right)^{3/2}\right]\left(\frac{a}{t}\right)^2$$

$$H_2 = 1 - \left(2.11-0.77\,\frac{c}{a}\right)\frac{a}{t} + \left[0.55-0.72\left(\frac{c}{a}\right)^{3/4}+0.14\left(\frac{c}{a}\right)^{1.5}\right]\left(\frac{a}{t}\right)^2$$

$$p = 0.2 + c/a + 0.6\,a/t$$

## Crack Code: 1020 - One Corner Crack From Center Open Hole
## 1030 - Two Corner Cracks From Center Open Hole




The angle, $\phi$, represents the point along the part-through crack perimeter, P, at which the stress intensity, K, is computed.

To calculate K for the crack depth, a, $\phi$ = 90
To calculate K for the crack length, c, $\phi$ = 10

The point, P, is defined using the following procedure:

1) A circular arc is drawn which is within the crack perimeter and which has a radius equal to "a" for a shallow crack (or "c" for a deep crack);

2) The point along the arc, P', is defined by $\phi$ which is measured from the X axis;

3) A line is drawn parallel to the X axis for a shallow crack (or parallel to the Y axis for a deep crack) through P' to the crack perimeter.

Crack Code: 1020 - One Corner Crack from Center Open Hole
1030 - Two Corner Cracks from Center Open Hole

Reference: Newman, J. C. and Raju, I. S., "Stress Intensity Factor Equations for Cracks in Three Dimensional Finite Bodies Subjected to Tension and Bending Loads," NASA Tech Memorandum 85793, April 1984.

$K = K_t(\phi) + K_b(\phi)$

t - tension, b - bending

$K_a = K_t(\phi=90^\circ) + K_b(\phi=90^\circ)$

$K_c = K_t(\phi=10^\circ) + K_b(\phi=10^\circ)$

$$K_t(\phi) = \sigma_t \sqrt{\pi \frac{a}{Q}}\, F \qquad K_b(\phi) = \sigma_b \sqrt{\pi \frac{a}{Q}}\, F\, H$$

where

$$Q = 1 + 1.464 \left(\frac{a}{c}\right)^{1.65} \quad \text{for } \frac{a}{c} \leq 1$$

$$Q = 1 + 1.464 \left(\frac{a}{c}\right)^{1.65} \quad \text{for } \frac{a}{c} > 1$$

$$F = m\, g_1\, g_2\, g_3\, g_4\, f_\phi\, f_w$$

$$H = H_1 + (H_2 - H_1) \sin^p \phi$$

and

$$g_2 = \frac{1 + 0.358\lambda + 1.425\lambda^2 - 1.578\lambda^3 + 2.156\lambda^4}{1 + 0.13\lambda^2}$$

where

$$\lambda = \frac{1}{1 + c/R \cos(\mu\phi)}$$

$\mu = 0.85$ - tension

$\mu = 0.85 - 0.25\ (a/t)^{1/4}$ - bending

$$f_w = \left[\sec\left(\frac{\pi R}{2b}\right) \sec\left(\frac{\pi(2R+nc)}{4(b-c)+2nc}\sqrt{\frac{a}{t}}\right)\right]^{1/2} \quad n = \#\text{ of cracks (1 or 2)}$$

for $a/c \le 1$

$$m = (1.13-0.09\, a/c) + \left(-0.54 + \frac{0.89}{0.2+a/c}\right)\left(\frac{a}{t}\right)^2 + \left(0.5 - \frac{1}{0.65+a/c} + 14(1-a/c)^{24}\right)\left(\frac{a}{t}\right)^4$$

$$g_1 = 1 + \left[0.1 + 0.35\left(\frac{a}{t}\right)^2\right](1 - \sin\phi)^2$$

$$g_3 = \left(1+0.04\,\frac{a}{c}\right)\left[1+0.1(1-\cos\phi)^2\right]\left[0.85+0.15\left(\frac{a}{t}\right)^{1/4}\right]$$

$$g_4 = 1 - 0.7\left(1 - \frac{a}{t}\right)\left(\frac{a}{c} - 0.2\right)\left(1 - \frac{a}{c}\right)$$

$$f_\phi = \left[\left(\frac{a}{c}\right)^2 \cos^2\phi + \sin^2\phi\right]^{1/4}$$

$$H_1 = 1 + \left[-0.43-0.74\,\frac{a}{c} -0.84\left(\frac{a}{c}\right)^2\right]\frac{a}{t} + \left[1.25-1.19\,\frac{a}{c} +4.39\left(\frac{a}{c}\right)^2\right]\left(\frac{a}{t}\right)^2 - \left[1.94-4.22\,\frac{a}{c} +5.51\left(\frac{a}{c}\right)^2\right]\left(\frac{a}{t}\right)^3$$

$$H_2 = 1 + \left[-1.50-0.04\,\frac{a}{c} -1.73\left(\frac{a}{c}\right)^2\right]\frac{a}{t} + \left[1.71-3.17\,\frac{a}{c} +6.84\left(\frac{a}{c}\right)^2\right]\left(\frac{a}{t}\right)^2 - \left[1.28-2.71\,\frac{a}{c} +5.22\left(\frac{a}{c}\right)^2\right]\left(\frac{a}{t}\right)^3$$

$$p = 0.1 + 1.3\,\frac{a}{t} + 1.1\,\frac{a}{c} - 0.7\,\frac{a}{c}\frac{a}{t}$$

for a/c > 1

$$m = \sqrt{\frac{c}{a}}\left(1+0.04\,\frac{c}{a}\right) + 0.2\left(\frac{c}{a}\right)^4\left(\frac{a}{t}\right)^2 - 0.11\left(\frac{c}{a}\right)^4\left(\frac{a}{t}\right)^4$$

$$g_1 = 1 + \left[0.1 + 0.35\,\frac{c}{a}\left(\frac{a}{t}\right)^2\right](1 - \sin\phi)^2$$

$$g_3 = \left(1.13-0.09\,\frac{c}{a}\right)\left[1+0.1(1-\cos\phi)^2\right]\left[0.85+0.15\left(\frac{a}{t}\right)^{1/4}\right]$$

$$g_4 = 1$$

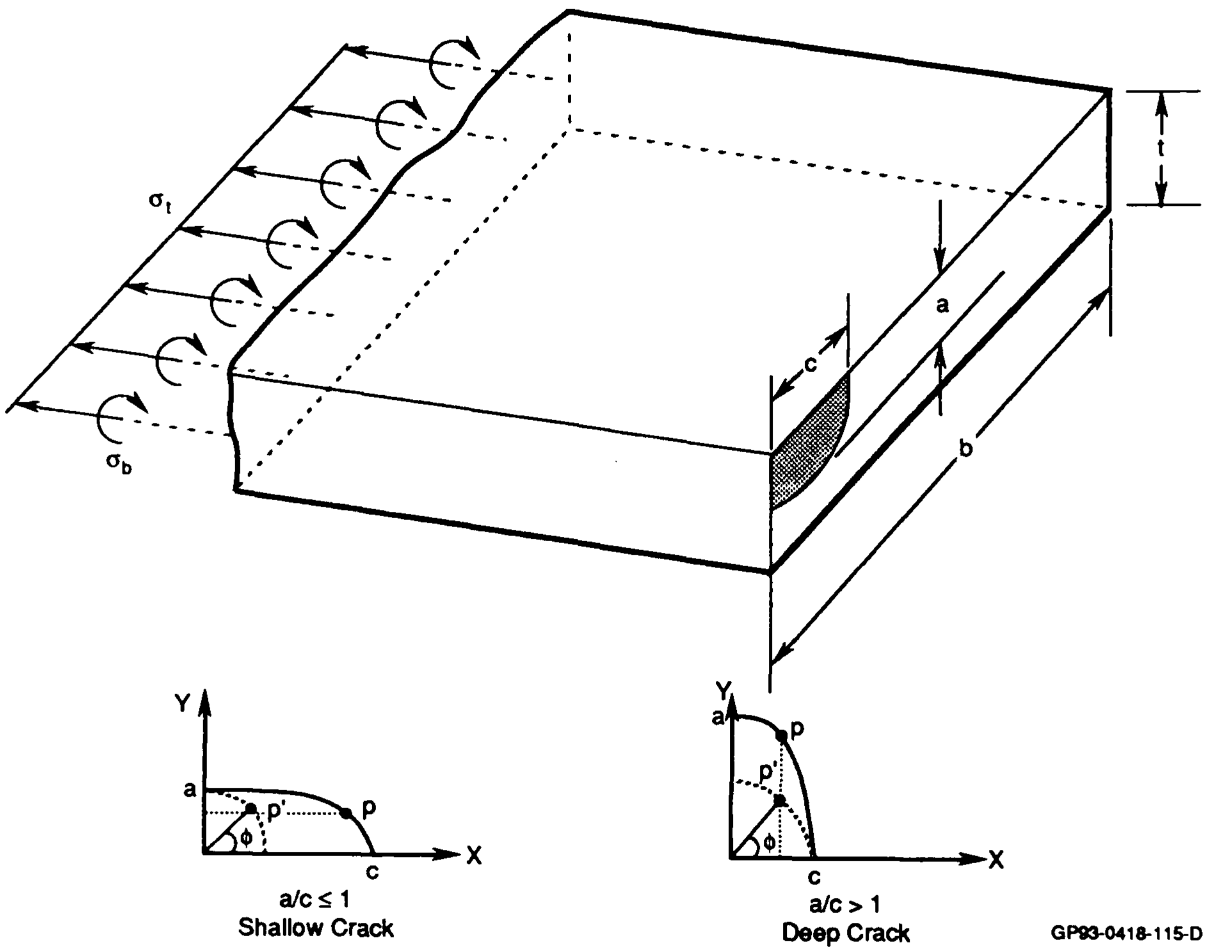
$$f_\phi = \left[\left(\frac{c}{a}\right)^2\sin^2\phi + \cos^2\phi\right]^{1/4}$$

$$H_1 = 1 - \left(2.07-0.06\,\frac{c}{a}\right)\frac{a}{t} + \left(4.35+0.16\,\frac{c}{a}\right)\left(\frac{a}{t}\right)^2 - \left(2.93+0.30\,\frac{c}{a}\right)\left(\frac{a}{t}\right)^3$$

$$H_2 = 1 - \left(3.64-0.37\,\frac{c}{a}\right)\frac{a}{t} + \left(5.87-0.49\,\frac{c}{a}\right)\left(\frac{a}{t}\right)^2 - \left(4.32-0.53\,\frac{c}{a}\right)\left(\frac{a}{t}\right)^3$$

$$p = 0.2 + c/a + 0.6\,a/t$$

# Crack Code: 1040 - One Corner Edge Crack




The angle, $\phi$, represents the point along the part-through crack perimeter, P, at which the stress intensity, K, is computed.

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To calculate K for the crack length, c, $\phi$ = 10

The point, P, is defined using the following procedure:

1) A circular arc is drawn which is within the crack perimeter and which has a radius equal to "a" for a shallow crack (or "c" for a deep crack);

2) The point along the arc, P', is defined by $\phi$ which is measured from the X axis;

3) A line is drawn parallel to the X axis for a shallow crack (or parallel to the Y axis for a deep crack) through P' to the crack perimeter.

Crack Code: 1040 - One Corner Edge Crack

Reference: Newman, J. C. and Raju, I. S., "Stress Intensity Factor Equations for Cracks in Three Dimensional Finite Bodies Subjected to Tension and Bending Loads," NASA Tech Memorandum 85793, April 1984.

$$K = K_t(\phi) + K_b(\phi)$$

t - tension, b - bending

$$K_a = K_t(\phi=90^\circ) + K_b(\phi=90^\circ)$$

$$K_c = K_t(\phi=10^\circ) + K_b(\phi=10^\circ)$$

$$K_t(\phi) = \sigma_t \sqrt{\pi \frac{a}{Q}}\, F \qquad K_b(\phi) = \sigma_b \sqrt{\pi \frac{a}{Q}}\, F\, H$$

where

$$Q = 1 + 1.464 \left(\frac{a}{c}\right)^{1.65} \quad \text{for} \quad \frac{a}{c} \le 1$$

$$Q = 1 + 1.464 \left(\frac{c}{a}\right)^{1.65} \quad \text{for} \quad \frac{a}{c} > 1$$

$$F = m\, g_1\, g_2\, f_\phi\, f_w$$

$$H = H_1 + (H_2 - H_1) \sin^p \phi$$

$$f_w = 1 - 0.2\lambda + 9.4\lambda^2 - 19.4\lambda^3 + 27.1\lambda^4$$

$$\lambda = \frac{c}{b} \sqrt{\frac{a}{t}}$$

for $a/c \le 1$

$$m = (1.08-0.03\ a/c) + \left(-0.44 + \frac{1.06}{0.3+a/c}\right)\left(\frac{a}{t}\right)^2 + \left(-0.5 + 0.25\frac{a}{c} + 14.8\left(1-\frac{a}{c}\right)^{15}\right)\left(\frac{a}{t}\right)^4$$

$$g_1 = 1 + \left[0.08 + 0.40\left(\frac{a}{t}\right)^2\right](1 - \sin\phi)^3$$

$$g_2 = 1 + \left[0.08 + 0.15\left(\frac{a}{t}\right)^2\right](1 - \cos\phi)^3$$

$$f_\phi = \left[\left(\frac{a}{c}\right)^2 \cos^2\phi + \sin^2\phi\right]^{1/4}$$

$$H_1 = 1 - 0.34\frac{a}{t} - 0.11\frac{a}{c}\frac{a}{t}$$

$$H_2 = 1 - \left(1.22+0.12\frac{a}{c}\right)\frac{a}{t} + \left[0.64-1.05\left(\frac{a}{c}\right)^{3/4}+0.47\left(\frac{a}{c}\right)^{3/2}\right]\left(\frac{a}{t}\right)^2$$

$$p = 0.2 + a/c + 0.6\ a/t$$

for a/c > 1 (deep surface crack)

$$m = \sqrt{\frac{c}{a}}\left(1.08-0.03\,\frac{c}{a}\right) + 0.375\left(\frac{c}{a}\right)^2\left(\frac{a}{t}\right)^2 - 0.25\left(\frac{c}{a}\right)^2\left(\frac{a}{t}\right)^4$$

$$g_1 = 1 + \left[0.08 + 0.40\left(\frac{c}{t}\right)^2\right](1 - \sin\phi)^3$$

$$g_2 = 1 + \left[0.08 + 0.15\left(\frac{c}{t}\right)^2\right](1 - \cos\phi)^3$$

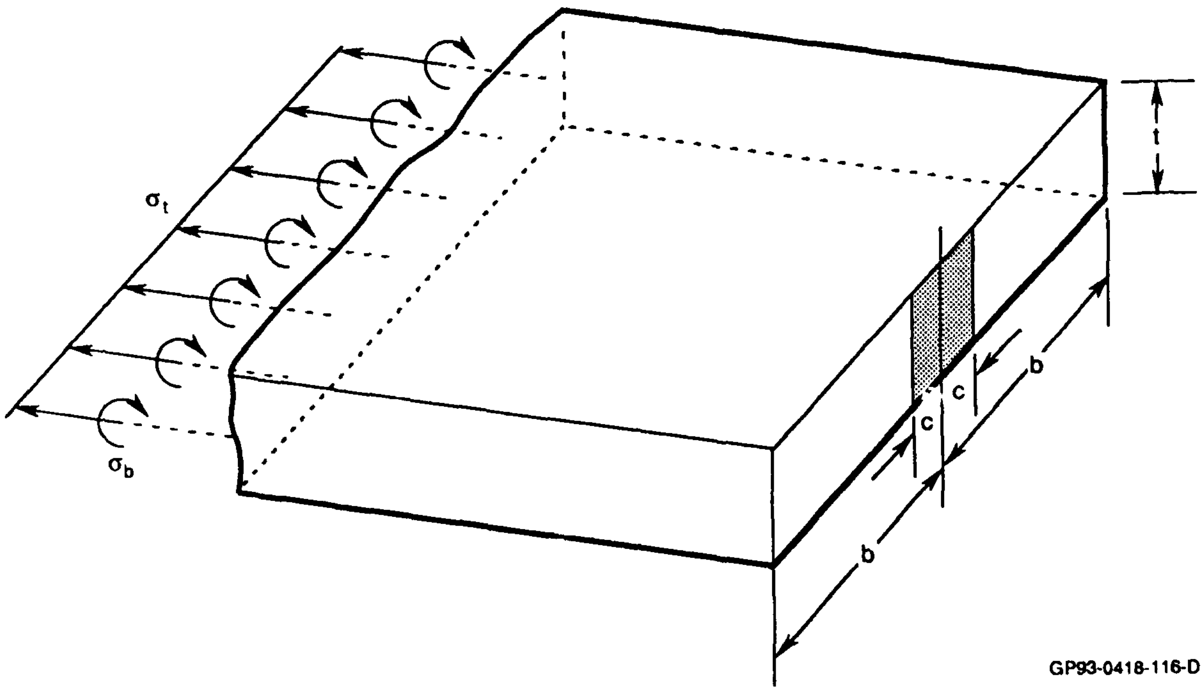
$$f_\phi = \left[\left(\frac{c}{a}\right)^2 \sin^2\phi + \cos^2\phi\right]^{1/4}$$

$$H_1 = 1 - \left(0.04+0.41\,\frac{c}{a}\right)\frac{a}{t} + \left[0.55-1.93\left(\frac{c}{a}\right)^{3/4}+1.38\left(\frac{c}{a}\right)^{3/2}\right]\left(\frac{a}{t}\right)^2$$

$$H_2 = 1 - \left(2.11-0.77\,\frac{c}{a}\right)\frac{a}{t} + \left[0.64-0.72\left(\frac{c}{a}\right)^{3/4}+0.14\left(\frac{c}{a}\right)^{1.5}\right]\left(\frac{a}{t}\right)^2$$

$$p = 0.2 + c/a + 0.6\,a/t$$

## Crack Code: 2010 - Center Crack

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Crack Code: 2010 - Center Crack

References:

Tension - ASTM E647-78T, "Tentative Test Method for Constant-Load-Amplitude Fatigue Crack Growth Rate Above $10^{-8}$ m/cyc," 1978 Annual Book of Standard, Vol. 10.

Bending - Rooke, D. P. and Cartwright, D. J., "Compendium of Stress Intensity Factors," 1976.

$K = K_t + K_b$

t - tension, b - bending

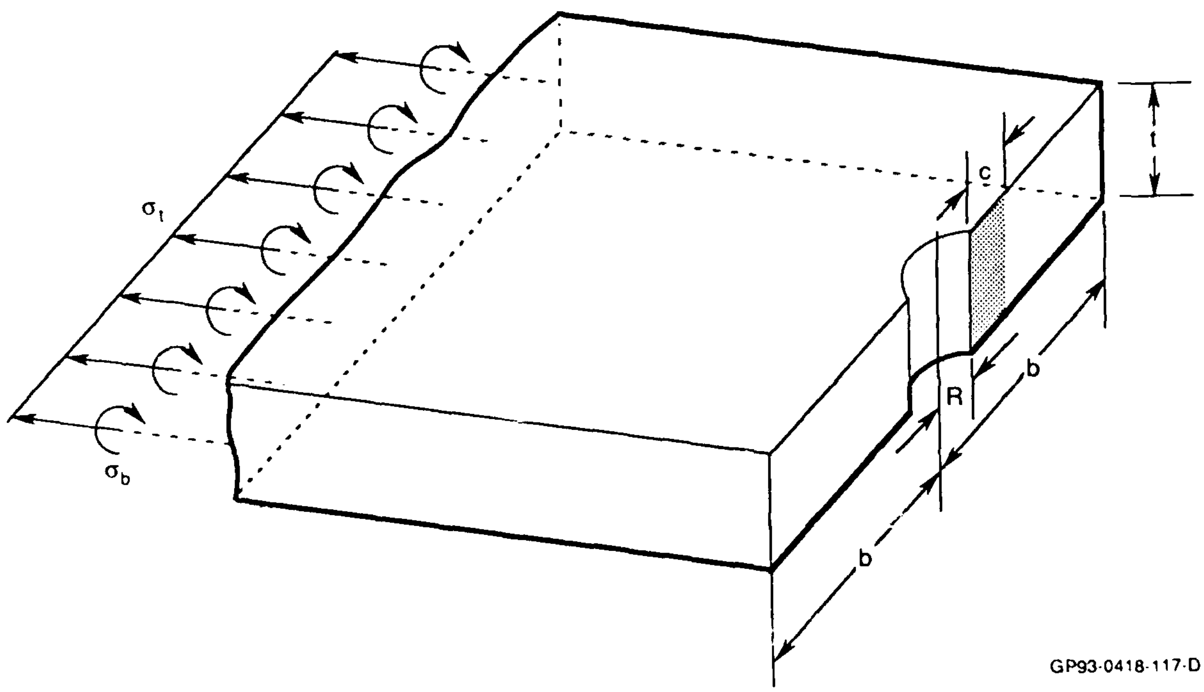
$$K_t = \sigma_t \sqrt{\pi c} \sqrt{\sec\left(\frac{\pi c}{2b}\right)}$$

$$K_b = \sigma_b \sqrt{\pi c} \frac{(1+\nu)}{(3+\nu)} \beta$$ where $\beta$ is defined by the following table

| c/b | $\beta$ |
|---|---|
| 0.000 | 1.000 |
| 0.050 | 1.002 |
| 0.105 | 1.006 |
| 0.125 | 1.008 |
| 0.150 | 1.012 |
| 0.195 | 1.022 |
| 0.240 | 1.036 |
| 0.300 | 1.058 |
| 0.350 | 1.080 |
| 0.395 | 1.102 |
| 0.425 | 1.118 |
| 0.450 | 1.132 |
| 0.485 | 1.152 |

Note: $\beta \approx \sqrt{\sec\left(\frac{\pi c}{2b}\right)}$

## Crack Code: 2020 - One Crack From Center Open Hole

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Crack Code: 2020 - One Crack from Center Open Hole

References:

Tension - Newman, J. C., "Predicting Failure of Specimens With Either Surface Cracks or Corner Cracks at Holes," NASA TN D-8244, June 1976.

Bending - Rooke, D. P. and Cartwright, D. J., "Compendium of Stress Intensity Factors," 1976.

$K = K_t + K_b$

t - tension, b - bending

$$K_t = \sigma_t \sqrt{\pi c}\ f_w\ (0.707 - 0.18\lambda + 6.55\lambda^2 - 10.54\lambda^3 + 6.85\lambda^4)$$

where $\lambda = \dfrac{1}{1 + c/R}$ and $f_w = \sqrt{\sec\left[\dfrac{\pi}{2}\left(\dfrac{2R+c}{2b-c}\right)\right]\ \sec\left(\dfrac{\pi R}{2b}\right)}$

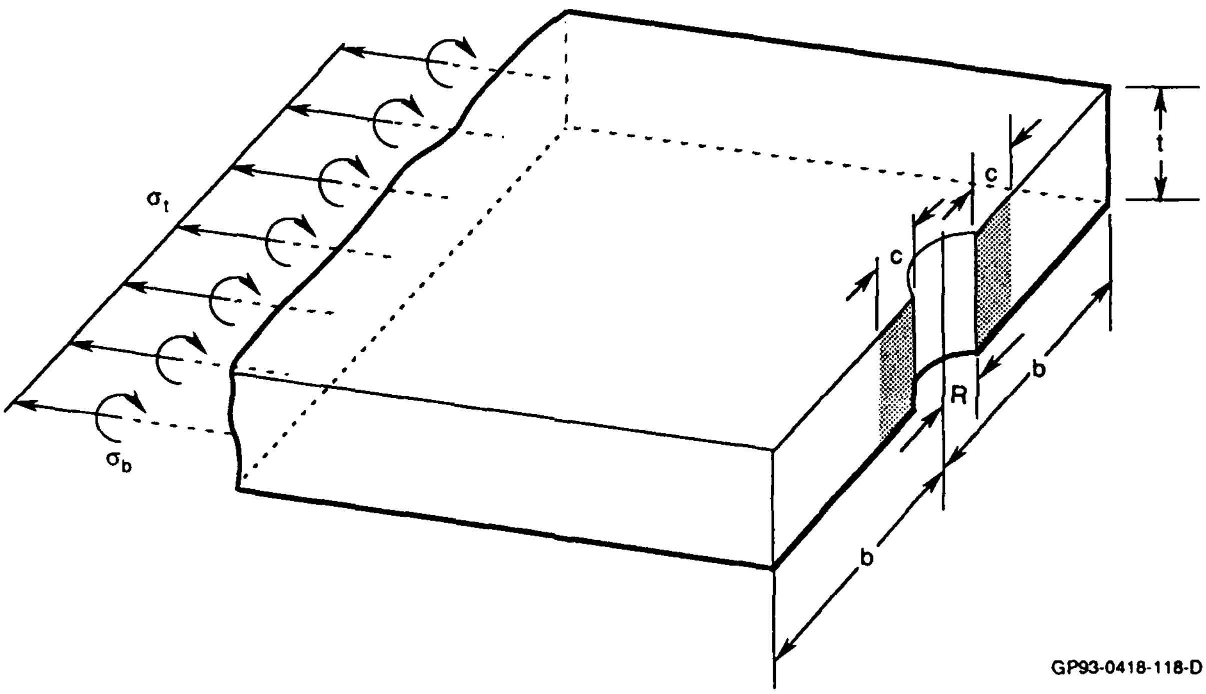
A bending solution was provided in the reference for an infinitely wide plate. This solution was multiplied by the finite width factor, $f_w$, for tension loads.

$$K_b = \sigma_b \sqrt{\pi(c+R)}\ \frac{(1+\nu)}{(3+\nu)}\ \beta\ f_w$$

where $f_w$ is defined above and $\beta$ is listed in the following table.

| (c+R)/R | $\beta$ |
|---|---|
| 1.05 | 0.40 |
| 1.10 | 0.52 |
| 1.15 | 0.62 |
| 1.20 | 0.68 |
| 1.25 | 0.72 |
| 1.30 | 0.76 |
| 1.40 | 0.82 |
| 1.50 | 0.86 |
| 1.60 | 0.88 |
| 1.70 | 0.90 |
| 1.80 | 0.91 |
| 2.00 | 0.92 |
| 2.25 | 0.92 |
| 2.50 | 0.91 |
| 2.90 | 0.90 |
| 3.60 | 0.88 |
| 4.30 | 0.86 |
| 5.00 | 0.84 |

## Crack Code: 2030 - Two Cracks From Center Open Hole

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Crack Code: 2030 - Two Cracks from Center Open Hole

References:

Tension - Newman, J. C., "Predicting Failure of Specimens With Either Surface Cracks or Corner Cracks at Holes," NASA TN D-8244, June 1976.

Bending - Rooke, D. P. and Cartwright, D. J., "Compendium of Stress Intensity Factors," 1976.

$K = K_t + K_b$

t - tension, b - bending

$$K_t = \sigma_t \sqrt{\pi c}\ f_w \left(1.00 - 0.15\lambda + 3.46\lambda^2 - 4.47\lambda^3 + 3.52\lambda^4\right)$$

where $\lambda = \dfrac{1}{1 + c/R}$ and $f_w = \sqrt{\sec\left[\dfrac{\pi}{2}\left(\dfrac{R+c}{b}\right)\right] \sec\left(\dfrac{\pi R}{2b}\right)}$

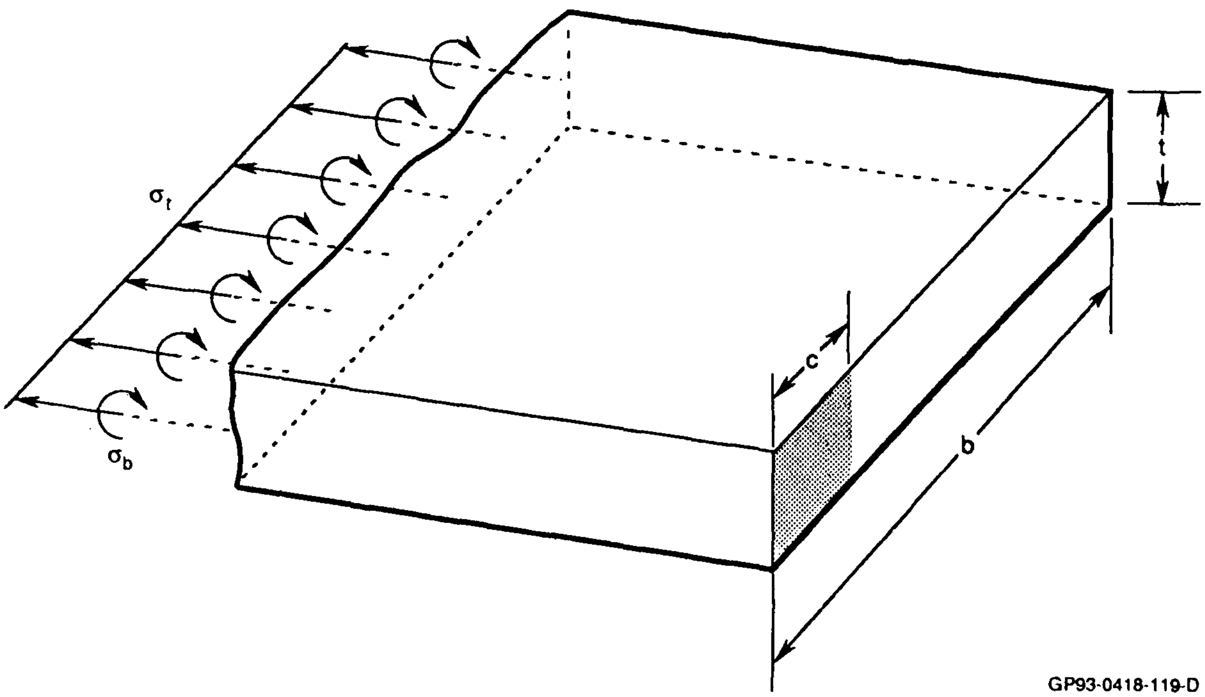
A bending solution was provided in the reference for an infinitely wide plate. This solution was multiplied by the finite width factor, $f_w$, for tension loads.

$$K_b = \sigma_b \sqrt{\pi(c+R)}\ \frac{(1+\nu)}{(3+\nu)}\ \beta\ f_w$$

where $f_w$ is defined above and $\beta$ is listed in the following table.

| (c+R)/R | $\beta$ |
|---|---|
| 1.05 | 0.40 |
| 1.10 | 0.52 |
| 1.15 | 0.62 |
| 1.20 | 0.68 |
| 1.25 | 0.74 |
| 1.30 | 0.78 |
| 1.40 | 0.83 |
| 1.50 | 0.87 |
| 1.60 | 0.90 |
| 1.70 | 0.92 |
| 1.80 | 0.94 |
| 2.00 | 0.96 |
| 2.25 | 0.97 |
| 2.50 | 0.98 |
| 2.90 | 0.99 |
| 3.60 | 1.00 |
| 4.30 | 1.00 |
| 5.00 | 1.00 |

## Crack Code: 2040 - One Edge Crack

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Crack Code: 2040 - One Edge Crack

References: Tada, H., Paris, P., and Irwin, T., The Stress Analysis of Cracks Handbook, Del Research Corp, 1973.

$K = K_t + K_b$

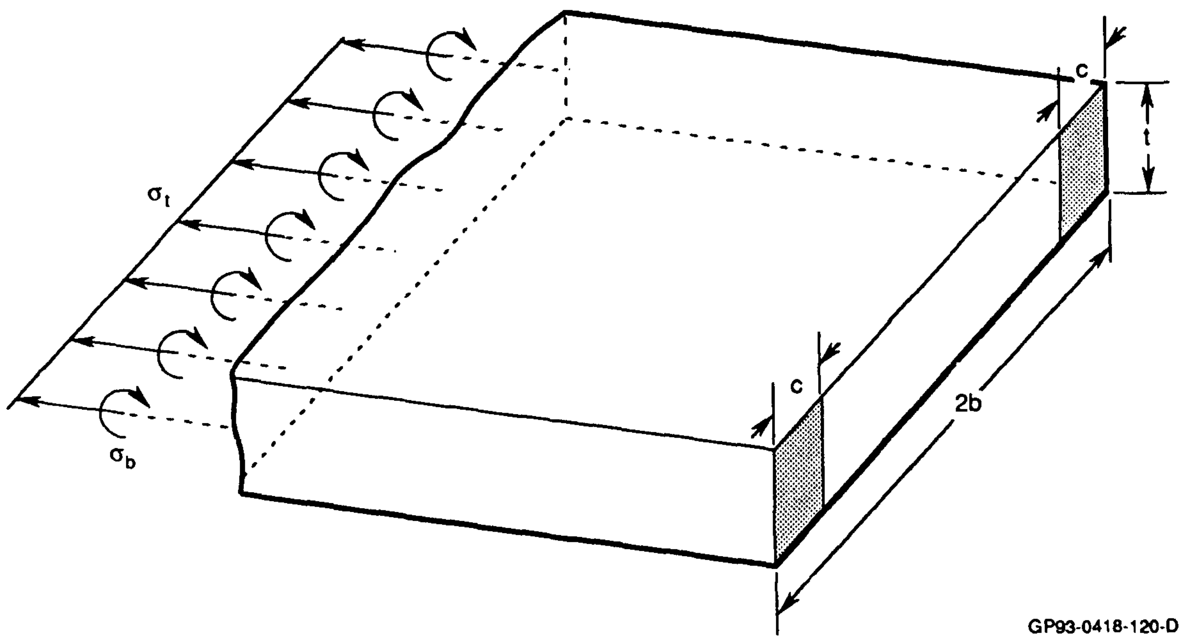
t - tension, b - bending

$$K_t = \sigma_t \sqrt{\pi c} \left[ \frac{0.752 + 2.02 \frac{c}{b} + 0.37 \left[1 - \sin\left(\frac{\pi c}{2b}\right)\right]^3}{\cos\left(\frac{\pi c}{2b}\right)} \right] \sqrt{\frac{2b}{\pi c} \tan\left(\frac{\pi c}{2b}\right)}$$

A finite width bending solution was determined by multiplying the infinite width bending solution by the finite width factor for a center cracked panel.

$$K_b = \sigma_b \sqrt{\pi c} \left(1.12 \frac{(1+\nu)}{(3+\nu)} \sqrt{\sec\left(\frac{\pi c}{b}\right)}\right)$$

## Crack Code: 2050-Two Edge Cracks



Crack Code: 2050 - Two Edge Cracks

References: Tada, H., Paris, P., and Irwin, T., <u>The Stress Analysis of Cracks Handbook</u>, Del Research Corp, 1973.

$K = K_t + K_b$

t - tension, b - bending

$$K_t = \sigma_t \sqrt{\pi c}\left[1 + 0.122 \cos^4\left(\frac{\pi c}{2b}\right)\right]\sqrt{\frac{2b}{\pi c}\tan\left(\frac{\pi c}{2b}\right)}$$

A finite width bending solution was determined by multiplying the finite width tension solution by the ratio of the bending to tension solutions for a single edge crack (Crack Code 2040).

$$K_b = \sigma_b \sqrt{\pi c}\,\frac{(1+\nu)}{(3+\nu)}\,\beta$$

where $\beta = \beta_t \left(\frac{\beta_b}{\beta_t}\right)_{2040}$

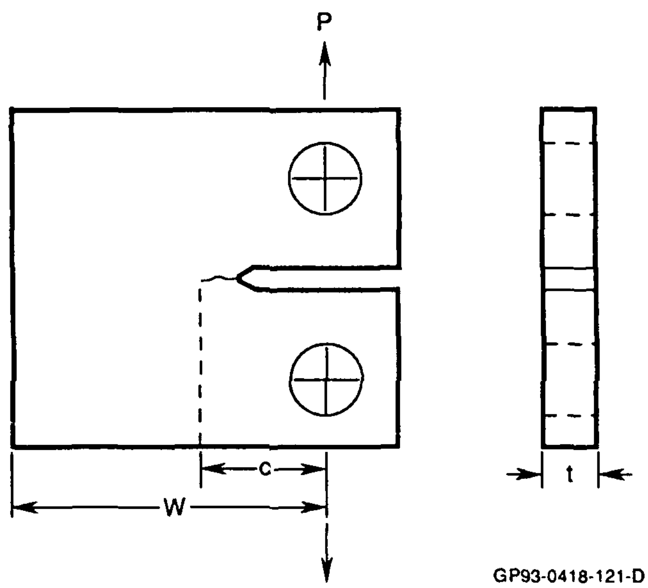
$$\beta_t = \left[1 + 0.122 \cos^4\left(\frac{\pi c}{2b}\right)\right]\sqrt{\frac{2b}{\pi c}\tan\left(\frac{\pi c}{2b}\right)}$$

$$\beta_b(2040) = 1.12\sqrt{\sec\left(\frac{\pi c}{b}\right)}$$

$$\beta_t(2040) = \left[\frac{0.752 + 2.02\,\frac{c}{b} + 0.37\left[1-\sin\left(\frac{\pi c}{2b}\right)\right]^3}{\cos\left(\frac{\pi c}{2b}\right)}\right]\sqrt{\frac{2b}{\pi c}\tan\left(\frac{\pi c}{2b}\right)}$$

Note: The variable "b" represents the plate width for the one edge crack solutions and the plate half width for the two edge cracks solutions.

## Crack Code: 2060-ASTM Compact Tension Specimen




GP93-0418-121-D

Crack Code: 2060 - ASTM Compact Tension Specimen

References: ASTM E647-78T, "Tentative Test Method for Constant-Load-Amplitude Fatigue Crack Growth Rate Above $10^{-8}$ m/cyc," <u>1978 Annual Book of Standard</u>, Vol. 10.

$$K = \frac{P}{t\sqrt{w}}(2+\alpha)(0.886 + 4.64\alpha - 13.32\alpha^{2} + 14.72\alpha^{3} - 5.6\alpha^{4})/(1-\alpha)^{1.5}$$

where $P = \sigma t w$ and $\alpha = c/w$

Crack Code: 2070 - User Defined Stress Intensity Solution

$$K = K_t + K_b$$

$$K_t = \sigma_t \sqrt{\pi c}\ \beta_t$$

$$K_b = \sigma_b \sqrt{\pi c}\ \beta_b$$

where $\beta_t$ and $\beta_b$ are defined by the user in an input data file.

The file must consist of a title, number of points, and c vs. $\beta$ data for both the tension and bending solutions. The exact format is listed below.

Title for tension data
\# of points - np
$c_i$ $\beta_{ti}$
$c_{i+1}$ $\beta_{t(i+1)}$
. .
. .
. .
$c_{np}$ $\beta_{tnp}$
Title for bending data
\# of points - np
$c_i$ $\beta_{bi}$
$c_{i+1}$ $\beta_{b(i+1)}$
. .
. .
. .
$c_{np}$ $\beta_{bnp}$

# APPENDIX B

## MATERIAL DATA FILES

6Al-2Sn-4Zr-2Mo Titanium

1) TI6242RT2.DAT - Room Temperature Crack Growth Rate Data

```
TI-6-2-4-2  ROOM TEMPERATURE  R=0.02
22  0.02  78.00
9.30  3.07813E-7
10.38  5.26316E-7
10.90  6.90000E-7
11.07  7.14815E-7
11.24  7.17857E-7
11.58  8.41667E-7
11.75  9.95000E-7
12.60  1.66667E-6
12.76  1.84906E-6
13.45  2.20000E-6
14.33  3.48077E-6
15.41  4.29545E-6
16.75  6.25000E-6
17.99  8.08000E-6
18.88  9.70000E-6
20.05  1.28333E-5
21.61  1.69167E-5
23.71  2.87143E-5
25.08  3.88000E-5
26.58  4.85000E-5
28.77  7.60714E-5
30.29  1.04706E-4
TI-6-2-4-2  ROOM TEMPERATURE  R=0.10
5  0.10
11.61  1.81E-6
13.00  2.52E-6
16.00  4.82E-6
20.00  10.3E-6
24.68  22.0E-6
TI-6-2-4-2  ROOM TEMPERATURE  R=0.50
7  0.50
7.050  0.52E-6
8.000  0.919E-6
9.000  1.50E-6
10.00  2.27E-6
13.00  5.70E-6
16.00  10.5E-6
19.52  17.1E-6
TI-6-2-4-2  ROOM TEMPERATURE  R=0.50
54 0.50
11.98320      2.8164297E-06
12.04811      3.1324630E-06
```

| | |
|---|---|
| 12.11879 | 3.3833046E-06 |
| 12.17333 | 3.6212468E-06 |
| 12.28454 | 4.0549276E-06 |
| 12.36720 | 3.9440069E-06 |
| 12.44780 | 3.8894468E-06 |
| 12.48791 | 4.2945362E-06 |
| 12.54067 | 4.7090498E-06 |
| 12.57504 | 4.8018751E-06 |
| 12.66501 | 5.8475948E-06 |
| 12.72880 | 6.3776329E-06 |
| 12.80059 | 5.9811596E-06 |
| 12.85642 | 6.4148053E-06 |
| 12.90194 | 6.6544440E-06 |
| 12.99314 | 7.0302417E-06 |
| 13.07669 | 7.3894516E-06 |
| 13.21272 | 8.1730259E-06 |
| 13.29805 | 8.2586066E-06 |
| 13.39075 | 8.3101295E-06 |
| 13.46981 | 8.3922550E-06 |
| 13.51792 | 8.4707926E-06 |
| 13.66700 | 8.2171482E-06 |
| 13.72843 | 7.5792177E-06 |
| 13.79089 | 7.7188570E-06 |
| 13.81223 | 7.5430526E-06 |
| 13.93681 | 9.3804574E-06 |
| 13.99659 | 9.7616230E-06 |
| 14.11848 | 1.0908473E-05 |
| 14.26966 | 1.2121943E-05 |
| 14.34134 | 1.1686649E-05 |
| 14.51358 | 1.1355761E-05 |
| 14.60792 | 1.1158489E-05 |
| 14.71465 | 1.1651543E-05 |
| 14.78842 | 1.1146747E-05 |
| 15.00462 | 1.2409668E-05 |
| 15.19287 | 1.3376794E-05 |
| 15.30642 | 1.4070672E-05 |
| 15.48597 | 1.4556725E-05 |
| 15.65467 | 1.4021382E-05 |
| 15.76318 | 1.4138620E-05 |
| 15.82262 | 1.5209803E-05 |
| 16.01170 | 1.5989304E-05 |
| 16.28555 | 1.9204103E-05 |
| 16.56050 | 2.1336795E-05 |
| 16.77507 | 2.2243912E-05 |
| 17.04708 | 2.2701510E-05 |
| 17.30437 | 2.2069786E-05 |
| 17.57232 | 2.3255678E-05 |
| 17.89989 | 2.5606403E-05 |
| 18.24158 | 2.8371218E-05 |
| 18.55007 | 3.1142401E-05 |
| 19.23823 | 3.7649676E-05 |
| 20.16906 | 4.7966798E-05 |

TI-6-2-4-2 ROOM TEMPERATURE R=-0.30

108 -0.30

| | |
|---|---|
| 12.82337 | 5.2009959E-06 |
| 12.97266 | 5.6151684E-06 |
| 13.09086 | 5.8142800E-06 |
| 13.16851 | 5.8059709E-06 |
| 13.26294 | 5.9353806E-06 |
| 13.41803 | 6.1870969E-06 |
| 13.49929 | 6.4058645E-06 |
| 13.53793 | 6.4418364E-06 |
| 13.76488 | 7.5926609E-06 |
| 13.93729 | 8.4674484E-06 |
| 13.97129 | 8.2388697E-06 |
| 14.05782 | 8.5791498E-06 |
| 14.22992 | 8.6272548E-06 |
| 14.28748 | 6.9762627E-06 |
| 14.32428 | 7.1095915E-06 |
| 14.33768 | 7.1251729E-06 |
| 14.42274 | 8.6874461E-06 |
| 14.44691 | 9.8769269E-06 |
| 14.50067 | 1.2479446E-05 |
| 14.57167 | 1.3728237E-05 |
| 14.61493 | 1.2968489E-05 |
| 14.66046 | 1.1947954E-05 |
| 14.69509 | 1.1999944E-05 |
| 14.74601 | 9.6366502E-06 |
| 14.78539 | 9.0765370E-06 |
| 14.82199 | 9.2224373E-06 |
| 14.86633 | 9.7961156E-06 |
| 15.00185 | 1.1414328E-05 |
| 15.04350 | 1.1483757E-05 |
| 15.13538 | 1.1476663E-05 |
| 15.19723 | 1.0407384E-05 |
| 15.22690 | 1.1109881E-05 |
| 15.26538 | 1.0121292E-05 |
| 15.29154 | 1.1398432E-05 |
| 15.37548 | 1.3606118E-05 |
| 15.43989 | 1.4733459E-05 |
| 15.54496 | 1.5234850E-05 |
| 15.64868 | 1.2797284E-05 |
| 15.70166 | 1.1275174E-05 |
| 15.72434 | 8.3691657E-06 |
| 15.78756 | 7.7297618E-06 |
| 15.80926 | 8.5869297E-06 |
| 15.86076 | 1.0030038E-05 |
| 15.93224 | 1.0987487E-05 |
| 15.95824 | 1.0908690E-05 |
| 15.99744 | 1.1149641E-05 |
| 16.04755 | 1.1239395E-05 |
| 16.15843 | 1.2542925E-05 |
| 16.24445 | 1.2560793E-05 |
| 16.29879 | 1.2340795E-05 |
| 16.36464 | 1.2845288E-05 |
| 16.46422 | 1.2502209E-05 |
| 16.54106 | 1.3152179E-05 |
| 16.59485 | 1.4316377E-05 |

| | |
|---|---|
| 16.68795 | 1.5063582E-05 |
| 16.75615 | 1.5057115E-05 |
| 16.78927 | 1.4292285E-05 |
| 16.86914 | 1.4082717E-05 |
| 16.94968 | 1.4702307E-05 |
| 17.04775 | 1.4100667E-05 |
| 17.10599 | 1.4670114E-05 |
| 17.20381 | 1.5170020E-05 |
| 17.32992 | 1.5539656E-05 |
| 17.41803 | 1.5061084E-05 |
| 17.53664 | 1.7711438E-05 |
| 17.75014 | 1.8013920E-05 |
| 17.82653 | 1.7890037E-05 |
| 17.91034 | 1.8523291E-05 |
| 18.05436 | 1.7960070E-05 |
| 18.17182 | 1.7136503E-05 |
| 18.30613 | 1.7411818E-05 |
| 18.44029 | 1.6765325E-05 |
| 18.50782 | 1.6932036E-05 |
| 18.57791 | 1.7327224E-05 |
| 18.74128 | 1.9000336E-05 |
| 18.83856 | 1.8765028E-05 |
| 18.90606 | 1.9271847E-05 |
| 18.95753 | 2.0664320E-05 |
| 19.08171 | 1.9507541E-05 |
| 19.19134 | 2.0310723E-05 |
| 19.31847 | 1.9567175E-05 |
| 19.41556 | 1.9975116E-05 |
| 19.49946 | 2.0071600E-05 |
| 19.63835 | 1.9934578E-05 |
| 19.68287 | 1.9071687E-05 |
| 19.88767 | 1.9036064E-05 |
| 19.96734 | 1.7519975E-05 |
| 20.02521 | 1.8806437E-05 |
| 20.07030 | 1.8965216E-05 |
| 20.14116 | 2.0865726E-05 |
| 20.22377 | 2.3731989E-05 |
| 20.50712 | 2.3250712E-05 |
| 20.58362 | 2.3674520E-05 |
| 20.81771 | 2.3812305E-05 |
| 21.05214 | 2.4260897E-05 |
| 21.37333 | 2.5420326E-05 |
| 21.51024 | 2.3881536E-05 |
| 21.56993 | 2.4602281E-05 |
| 21.66741 | 2.4229699E-05 |
| 21.88215 | 2.9365623E-05 |
| 22.17611 | 2.9424355E-05 |
| 22.33858 | 2.9658011E-05 |
| 22.57344 | 3.0073223E-05 |
| 22.88409 | 2.8046670E-05 |
| 23.18898 | 2.8611159E-05 |
| 23.68212 | 3.2006315E-05 |
| 23.99647 | 3.5426925E-05 |
| 24.21318 | 3.6321631E-05 |

2) T16242700.DAT - 700°F Crack Growth Rate Data

TI-6-2-4-2 700F R = 0.02
68 0.02 700.0

| | |
|---|---|
| 12.95973 | 1.0056033E-06 |
| 12.99192 | 7.8809262E-07 |
| 13.04954 | 7.9894102E-07 |
| 13.14170 | 8.8513031E-07 |
| 13.25886 | 9.1989870E-07 |
| 13.29782 | 9.4468209E-07 |
| 13.49434 | 1.1046782E-06 |
| 13.56874 | 1.0778213E-06 |
| 13.66747 | 1.1563257E-06 |
| 13.81178 | 1.2927418E-06 |
| 13.96857 | 1.2801155E-06 |
| 14.11185 | 1.5064323E-06 |
| 14.20719 | 1.6682834E-06 |
| 14.40443 | 2.2051595E-06 |
| 14.67244 | 2.7822230E-06 |
| 14.76923 | 2.7287454E-06 |
| 14.89188 | 3.0283622E-06 |
| 15.22182 | 3.2340999E-06 |
| 15.48823 | 3.3238514E-06 |
| 15.65521 | 3.3845729E-06 |
| 15.84199 | 3.5130602E-06 |
| 16.08624 | 3.8739713E-06 |
| 16.28523 | 5.1996740E-06 |
| 16.45148 | 4.8149209E-06 |
| 16.57772 | 5.2593923E-06 |
| 16.79273 | 5.9072008E-06 |
| 17.30968 | 5.8649211E-06 |
| 17.58196 | 6.4218902E-06 |
| 17.61520 | 6.6399616E-06 |
| 18.00100 | 7.5614935E-06 |
| 18.14235 | 7.3509746E-06 |
| 18.22273 | 7.2517732E-06 |
| 18.32751 | 7.0786923E-06 |
| 18.52680 | 7.2474968E-06 |
| 18.63632 | 7.1891154E-06 |
| 19.29768 | 8.6871423E-06 |
| 19.49935 | 8.2399511E-06 |
| 19.61622 | 8.2545212E-06 |
| 19.69949 | 8.7507233E-06 |
| 19.98705 | 9.0179137E-06 |
| 20.22674 | 1.0655602E-05 |
| 20.40662 | 1.1452321E-05 |
| 20.59579 | 1.1874525E-05 |
| 20.78944 | 1.2107944E-05 |
| 20.96605 | 1.2032046E-05 |
| 21.18143 | 1.1868566E-05 |
| 21.49658 | 1.1556473E-05 |
| 21.86902 | 1.1779997E-05 |
| 22.35209 | 1.2713339E-05 |
| 22.48677 | 1.3376775E-05 |

| | |
|---|---|
| 22.74924 | 1.3510255E-05 |
| 22.95592 | 1.4401023E-05 |
| 23.36759 | 1.4886061E-05 |
| 23.64969 | 1.5333888E-05 |
| 23.87181 | 1.6005335E-05 |
| 24.21987 | 1.6798056E-05 |
| 24.38649 | 1.7594552E-05 |
| 24.48992 | 1.7285762E-05 |
| 24.77601 | 1.8463743E-05 |
| 25.29716 | 1.8871462E-05 |
| 25.59401 | 2.0063921E-05 |
| 25.80326 | 2.0755206E-05 |
| 26.22368 | 2.1449376E-05 |
| 27.34283 | 2.6425871E-05 |
| 27.76544 | 2.7218475E-05 |
| 28.22918 | 2.8682938E-05 |
| 28.70186 | 3.0037942E-05 |
| 29.09566 | 3.1351978E-05 |

3) TI6242TP.DAT - 1000°F Crack Growth Rate Data

TI-6-2-4-2 1000F R=0.02
59 0.02 1000.0

| | |
|---|---|
| 12.24114 | 2.3771713E-06 |
| 12.55290 | 2.5807217E-06 |
| 12.70512 | 2.5472250E-06 |
| 12.89219 | 2.7193116E-06 |
| 12.93233 | 2.9396856E-06 |
| 13.10742 | 3.3338774E-06 |
| 13.12374 | 3.1883694E-06 |
| 13.26810 | 3.4697464E-06 |
| 13.49421 | 3.9242336E-06 |
| 13.67379 | 3.8123430E-06 |
| 13.89904 | 3.8387457E-06 |
| 14.23550 | 3.9562055E-06 |
| 14.26045 | 3.9894949E-06 |
| 14.51546 | 4.2375746E-06 |
| 14.60703 | 4.3809814E-06 |
| 14.77401 | 4.6619680E-06 |
| 14.86581 | 4.8394736E-06 |
| 15.09969 | 5.5440028E-06 |
| 15.36435 | 6.1301789E-06 |
| 15.96983 | 7.0947394E-06 |
| 16.25931 | 7.3051692E-06 |
| 16.67159 | 7.5013659E-06 |
| 16.81885 | 7.5170583E-06 |
| 17.04979 | 7.8877429E-06 |
| 17.10549 | 7.8029761E-06 |
| 17.30001 | 8.1802400E-06 |
| 17.78446 | 9.4044799E-06 |
| 17.82433 | 9.4943625E-06 |
| 17.93093 | 9.4268817E-06 |
| 18.01577 | 9.8757710E-06 |
| 18.33754 | 9.7455841E-06 |
| 18.72154 | 1.0282461E-05 |
| 18.84918 | 1.0867386E-05 |
| 19.45422 | 1.2636085E-05 |
| 19.47469 | 1.2955852E-05 |
| 19.76695 | 1.3927078E-05 |
| 20.21700 | 1.5436977E-05 |
| 20.79997 | 1.7068791E-05 |
| 21.13082 | 1.8892322E-05 |
| 21.18698 | 1.7649640E-05 |
| 21.31914 | 1.7553257E-05 |
| 21.37223 | 1.8657376E-05 |
| 21.99438 | 1.9491576E-05 |
| 22.63980 | 2.0636136E-05 |
| 23.62510 | 2.2672484E-05 |
| 23.93072 | 2.3686584E-05 |
| 24.15357 | 2.4279503E-05 |
| 24.48113 | 2.5801064E-05 |
| 24.83452 | 2.7034856E-05 |

| | |
|---|---|
| 25.14293 | 2.8575590E-05 |
| 25.56205 | 2.9076406E-05 |
| 25.74034 | 2.9335804E-05 |
| 26.32083 | 3.2541524E-05 |
| 27.42282 | 3.8681563E-05 |
| 29.17190 | 4.8827787E-05 |
| 29.63471 | 5.1419171E-05 |
| 33.25778 | 6.5345404E-05 |
| 33.61279 | 8.1460370E-05 |
| 34.78603 | 9.7299111E-05 |
| TI-6-2-4-2 | 1000F R=0.50 |
| 43 0.50 | |
| 14.44246 | 7.1119521E-06 |
| 14.60479 | 7.3203460E-06 |
| 14.72137 | 6.1384785E-06 |
| 14.84515 | 5.5119503E-06 |
| 14.95541 | 6.1815758E-06 |
| 15.13469 | 8.4583735E-06 |
| 15.20060 | 8.9393125E-06 |
| 15.36571 | 9.7434058E-06 |
| 15.53156 | 1.0546978E-05 |
| 15.70399 | 9.4962988E-06 |
| 15.82073 | 9.4164352E-06 |
| 15.93539 | 9.1228067E-06 |
| 16.05022 | 9.4642746E-06 |
| 16.17923 | 1.0148793E-05 |
| 16.32849 | 9.9226090E-06 |
| 16.46310 | 9.7856928E-06 |
| 16.58619 | 9.5931282E-06 |
| 16.70918 | 1.0219855E-05 |
| 16.83220 | 1.1446466E-05 |
| 16.94442 | 1.1458976E-05 |
| 17.06814 | 1.3540745E-05 |
| 17.28940 | 1.5614583E-05 |
| 17.63342 | 1.7232231E-05 |
| 17.74346 | 1.7853015E-05 |
| 18.06975 | 1.9777443E-05 |
| 18.94416 | 2.6631968E-05 |
| 19.66923 | 3.2454376E-05 |
| 20.21969 | 3.6327063E-05 |
| 20.42749 | 3.1053340E-05 |
| 20.68716 | 3.3165510E-05 |
| 20.85464 | 2.7457145E-05 |
| 21.72616 | 3.1471718E-05 |
| 22.04916 | 3.3489541E-05 |
| 23.01842 | 3.9205228E-05 |
| 23.58749 | 4.2939602E-05 |
| 23.95889 | 4.4810065E-05 |
| 24.34722 | 4.7800204E-05 |
| 25.08644 | 5.2967844E-05 |
| 25.76475 | 6.0594055E-05 |
| 26.16533 | 6.3363295E-05 |
| 26.58566 | 6.5835957E-05 |
| 27.28802 | 7.2837502E-05 |
| 27.73828 | 8.0407954E-05 |

4) DAMTISLOW.DAT - Low Frequency Crack Growth Rate Data (Wei-Landes)

```
TI-6-2-4-2  R=0.02  30 SEC HOLD  1000F  CCT
31    30.1    30
13.93651      4.1299941E-06
14.19901      5.9843810E-06
19.32822      1.0949999E-05
19.69200      1.2687482E-05
20.04570      1.9900024E-05
20.40559      1.0199994E-05
31.39969      5.0249993E-05
32.08582      6.5875050E-05
32.75226      6.4374952E-05
33.56441      7.8874975E-05
34.17585      5.9625356E-05
34.96577      7.7250006E-05
35.68145      1.4024944E-04
36.51009      8.1249920E-05
37.51283      9.8250064E-05
38.08798      1.1249990E-04
38.72849      1.2500018E-04
39.27319      1.0600001E-04
39.97333      1.3574987E-04
40.71850      1.4375031E-04
41.39631      1.2999952E-04
42.05339      1.2525023E-04
43.18528      2.1375000E-04
44.09497      1.6974985E-04
45.19314      2.0224988E-04
46.62813      2.5950014E-04
48.26014      2.8800010E-04
50.07355      3.1050027E-04
52.19106      3.4924984E-04
55.41023      5.0249993E-04
61.08631      8.0200017E-04
```

5) DAMTIFAST.DAT - High Frequency Crack Growth Rate Data (Wei-Landes)

```
TI-6-2-4-2  R=0.02  6HZ  1000F  CCT
59  .1667  0.0
12.24114      2.3771713E-06
12.55290      2.5807217E-06
12.70512      2.5472250E-06
12.89219      2.7193116E-06
12.93233      2.9396856E-06
13.10742      3.3338774E-06
13.12374      3.1883694E-06
13.26810      3.4697464E-06
13.49421      3.9242336E-06
13.67379      3.8123430E-06
13.89904      3.8387457E-06
14.23550      3.9562055E-06
14.26045      3.9894949E-06
14.51546      4.2375746E-06
14.60703      4.3809814E-06
14.77401      4.6619680E-06
14.86581      4.8394736E-06
15.09969      5.5440028E-06
15.36435      6.1301789E-06
15.96983      7.0947394E-06
16.25931      7.3051692E-06
16.67159      7.5013659E-06
16.81885      7.5170583E-06
17.04979      7.8877429E-06
17.10549      7.8029761E-06
17.30001      8.1802400E-06
17.78446      9.4044799E-06
17.82433      9.4943625E-06
17.93093      9.4268817E-06
18.01577      9.8757710E-06
18.33754      9.7455841E-06
18.72154      1.0282461E-05
18.84918      1.0867386E-05
19.45422      1.2636085E-05
19.47469      1.2955852E-05
19.76695      1.3927078E-05
20.21700      1.5436977E-05
20.79997      1.7068791E-05
21.13082      1.8892322E-05
21.18698      1.7649640E-05
21.31914      1.7553257E-05
21.37223      1.8657376E-05
21.99438      1.9491576E-05
22.63980      2.0636136E-05
23.62510      2.2672484E-05
23.93072      2.3686584E-05
24.15357      2.4279503E-05
24.48113      2.5801064E-05
24.83452      2.7034856E-05
```

| | |
|---|---|
| 25.14293 | 2.8575590E-05 |
| 25.56205 | 2.9076406E-05 |
| 25.74034 | 2.9335804E-05 |
| 26.32083 | 3.2541524E-05 |
| 27.42282 | 3.8681563E-05 |
| 29.17190 | 4.8827787E-05 |
| 29.63471 | 5.1419171E-05 |
| 33.25778 | 6.5345404E-05 |
| 33.61279 | 8.1460370E-05 |
| 34.78603 | 9.7299111E-05 |

6) DAMTIYDKC.DAT - Yield Strength and Fracture Toughness Data

```
TI-6-2-4-2  Temperature vs. % Room Temperature Fty and Kc
11
78    1.00   1.00
200    0.90   1.01
300    0.83   1.03
400    0.76   1.05
500    0.70   1.07
600    0.65   1.09
700    0.63   1.11
800    0.60   1.18
900    0.58   1.26
1000    0.56   1.33
1200    0.39   1.40
```

7) DAMTIEFYD.DAT - Effective Yield Strength Data

```
TI-6-2-4-2  Larson-Miller Data
19 20
18.0  1.0
19.0  1.0
20.0  0.98
21.0  0.96
22.0  0.92
23.0  0.88
24.0  0.79
25.0  0.70
26.0  0.61
27.0  0.52
28.0  0.43
29.0  0.34
30.0  0.25
31.0  0.19
32.0  0.14
33.0  0.09
34.0  0.06
35.0  0.04
36.0  0.03
```

8) DAMTIRSO.DAT - Overload Shut-Off Ratio Data

```
TI-6-2-4-2  RSO
2
78.0  1.000
1000.0  2.250
```

Inconel 718

1) IN718RT2.DAT - Room Temperature Crack Growth Rate Data

```
IN 718  ROOM TEMPERATURE  R=0.02
30 0.02 78.0
11.38  8.43478E-8
12.23  1.12921E-7
13.07  1.41429E-7
13.90  1.58984E-7
14.71  2.20000E-7
15.52  3.37931E-7
16.37  5.02778E-7
17.20  5.18750E-7
18.50  7.71154E-7
19.41  8.11538E-7
20.84  1.04737E-6
21.86  1.40714E-6
22.39  1.65833E-6
24.68  1.96667E-6
25.97  2.10000E-6
27.36  2.46250E-6
28.88  3.16667E-6
30.56  4.08000E-6
32.48  5.42857E-6
34.59  5.60526E-6
37.08  7.66071E-6
39.94  1.08125E-5
42.41  1.11471E-5
45.38  1.50403E-5
47.59  1.74167E-5
51.56  4.08000E-5
53.03  4.72500E-5
54.65  6.02857E-5
56.70  1.59375E-4
58.64  8.38889E-4
IN 718  ROOM TEMPERATURE  R=0.50
54  0.50
16.25136       1.6275364E-06
16.44015       1.7795087E-06
16.53609       1.8552017E-06
16.64884       1.8795572E-06
16.79462       2.0098173E-06
16.98907       2.0663529E-06
17.17624       1.9156946E-06
17.32963       1.7270282E-06
17.51097       1.5056642E-06
17.67110       1.5405578E-06
17.71065       1.6809461E-06
17.91430       2.1540250E-06
18.15896       2.4569392E-06
18.34789       2.6162290E-06
18.53702       2.3319635E-06
18.63837       2.3249570E-06
18.71841       2.0526631E-06
```

| | |
|---|---|
| 18.89123 | 2.1769420E-06 |
| 19.22356 | 2.7833601E-06 |
| 19.29049 | 2.9979069E-06 |
| 19.57374 | 3.3648914E-06 |
| 19.71315 | 3.3135536E-06 |
| 19.78158 | 3.2780431E-06 |
| 19.94974 | 3.3198291E-06 |
| 20.09968 | 3.1771008E-06 |
| 20.24878 | 3.1383513E-06 |
| 20.48940 | 3.3908229E-06 |
| 20.54119 | 3.4295783E-06 |
| 20.71444 | 3.2127452E-06 |
| 20.83747 | 3.3177710E-06 |
| 20.94025 | 3.0699000E-06 |
| 21.19345 | 3.4177790E-06 |
| 21.32380 | 3.6142649E-06 |
| 21.42630 | 3.8228759E-06 |
| 21.59353 | 4.2945671E-06 |
| 21.89157 | 3.9082020E-06 |
| 22.03443 | 3.5135135E-06 |
| 22.15425 | 3.2137145E-06 |
| 22.37004 | 3.1865518E-06 |
| 22.44794 | 2.9533048E-06 |
| 22.54100 | 3.2109131E-06 |
| 22.77532 | 3.9370757E-06 |
| 23.04969 | 3.8533612E-06 |
| 23.17474 | 3.8185931E-06 |
| 23.31198 | 3.9191955E-06 |
| 23.63893 | 4.2104830E-06 |
| 23.82086 | 4.0935297E-06 |
| 24.07446 | 4.4407834E-06 |
| 24.57635 | 5.3063136E-06 |
| 25.51971 | 6.2362551E-06 |
| 26.58320 | 7.1760537E-06 |
| 27.15391 | 7.7447903E-06 |
| 28.66426 | 8.8431007E-06 |
| 29.07442 | 9.1236525E-06 |

IN 718 ROOM TEMPERATURE R=-0.20

78 -0.20

| | |
|---|---|
| 16.96211 | 5.7082656E-07 |
| 17.09812 | 5.9458318E-07 |
| 17.22239 | 6.2099514E-07 |
| 17.29070 | 6.4558122E-07 |
| 17.35146 | 6.5401531E-07 |
| 17.43128 | 7.3393875E-07 |
| 17.50709 | 8.3472145E-07 |
| 17.68952 | 8.3978955E-07 |
| 17.80545 | 8.3000043E-07 |
| 17.86920 | 8.5723735E-07 |
| 18.15540 | 7.8042211E-07 |
| 18.24465 | 7.5850500E-07 |
| 18.36798 | 8.0988752E-07 |
| 18.65040 | 7.9482186E-07 |
| 18.68066 | 8.1558926E-07 |

| | |
|---|---|
| 18.78465 | 8.7192376E-07 |
| 18.94964 | 9.6726637E-07 |
| 19.01956 | 9.7899124E-07 |
| 19.16407 | 9.7059853E-07 |
| 19.34078 | 1.0584970E-06 |
| 19.45079 | 9.9093472E-07 |
| 19.69200 | 9.7222858E-07 |
| 19.76071 | 1.0031370E-06 |
| 19.88074 | 1.0821591E-06 |
| 20.09379 | 1.2572548E-06 |
| 20.26375 | 1.1801241E-06 |
| 20.37832 | 1.1437410E-06 |
| 20.49874 | 1.1365985E-06 |
| 20.62340 | 1.1141369E-06 |
| 20.69107 | 1.0931640E-06 |
| 20.82284 | 1.1964648E-06 |
| 20.97324 | 1.3480349E-06 |
| 21.12183 | 1.4592297E-06 |
| 21.27421 | 1.4812446E-06 |
| 21.41383 | 1.5652270E-06 |
| 21.53343 | 1.5911983E-06 |
| 21.72499 | 1.5973550E-06 |
| 21.82639 | 1.5943237E-06 |
| 21.97925 | 1.6084346E-06 |
| 22.12841 | 1.6706368E-06 |
| 22.27156 | 1.6891837E-06 |
| 22.40462 | 1.6816300E-06 |
| 22.53986 | 1.6615038E-06 |
| 22.67035 | 1.6402956E-06 |
| 22.82644 | 1.6096674E-06 |
| 22.96623 | 1.6129335E-06 |
| 23.10998 | 1.6402879E-06 |
| 23.21643 | 1.7405264E-06 |
| 23.38120 | 1.8755454E-06 |
| 23.52663 | 1.9808472E-06 |
| 23.63980 | 2.0210293E-06 |
| 23.77898 | 2.0960199E-06 |
| 23.92197 | 2.1130675E-06 |
| 24.05252 | 2.0944294E-06 |
| 24.19016 | 2.1108922E-06 |
| 24.33021 | 2.1781673E-06 |
| 24.45722 | 2.1837923E-06 |
| 24.60534 | 2.2188401E-06 |
| 24.72463 | 2.2611196E-06 |
| 24.87170 | 2.3646439E-06 |
| 25.01307 | 2.4679812E-06 |
| 25.15751 | 2.5713639E-06 |
| 25.62402 | 2.8148095E-06 |
| 26.08323 | 2.9282864E-06 |
| 26.52161 | 3.0145832E-06 |
| 26.97822 | 3.0868034E-06 |
| 27.35728 | 3.3274132E-06 |
| 27.82157 | 3.6635099E-06 |
| 28.30603 | 3.8668850E-06 |

| | |
|---|---|
| 28.66247 | 4.0927353E-06 |
| 29.07344 | 4.2579627E-06 |
| 29.49522 | 4.5068632E-06 |
| 29.95177 | 4.4132671E-06 |
| 30.39682 | 4.6478508E-06 |
| 30.85667 | 4.8376205E-06 |
| 31.24861 | 6.0775301E-06 |
| 31.87323 | 5.5826022E-06 |
| 31.71487 | 3.4699713E-07 |

2) IN718700B.DAT - 700°F Crack Growth Rate data

```
IN 718  700F  R=0.02
33  0.02  700.0
27.46840      3.1375612E-06
27.70918      3.4762645E-06
28.02901      3.8188964E-06
28.30748      4.0669856E-06
28.97405      4.8732700E-06
29.43915      5.1457832E-06
29.96050      5.3598751E-06
30.52848      5.4845955E-06
31.12998      5.3362101E-06
31.70527      5.3967665E-06
32.00620      5.9852932E-06
32.56040      6.8180575E-06
33.06298      6.7589644E-06
33.31664      7.3134797E-06
34.00009      7.3022984E-06
34.47981      6.6005427E-06
34.78731      5.8486080E-06
35.21016      5.9527342E-06
35.45134      7.4586583E-06
35.76089      6.7246829E-06
36.00711      8.1682847E-06
36.42505      8.7191420E-06
37.48728      9.0446229E-06
38.07090      9.4606548E-06
38.16132      9.4802745E-06
39.18535      1.0984112E-05
40.10015      1.1914944E-05
44.29990      1.5661002E-05
47.78953      1.8910829E-05
50.26295      2.3641600E-05
53.21253      3.0518837E-05
57.67523      4.1244828E-05
61.73172      6.5965738E-05
```

3) IN718TP.DAT - 1200°F Crack Growth Rate Data

```
IN 718  1200F  R=0.02
90  0.02  1200
17.75409        3.5016701E-06
17.95358        4.4837548E-06
18.18551        6.1404025E-06
18.53298        6.9778021E-06
18.64746        6.6931048E-06
18.96277        7.6664301E-06
19.18041        7.2141752E-06
19.59441        7.7685745E-06
19.83464        8.3370787E-06
19.96242        9.0006397E-06
20.50938        9.9298422E-06
20.72428        9.7922002E-06
21.08781        9.6374806E-06
21.44746        9.6261329E-06
21.75083        8.8670586E-06
22.07874        8.2637589E-06
22.49829        8.6504006E-06
22.81671        9.8082337E-06
23.01792        1.1730738E-05
23.31193        1.2283533E-05
23.60192        1.3392486E-05
24.02059        1.3846837E-05
24.52474        1.4327838E-05
24.92234        1.4229492E-05
25.22016        1.4998999E-05
25.55428        1.4458820E-05
25.72306        1.4690945E-05
26.10249        1.5047422E-05
26.43709        1.4557961E-05
26.93902        1.4616276E-05
27.51068        1.6764296E-05
27.95146        1.8707427E-05
28.38058        2.2555969E-05
28.94663        2.3579963E-05
29.16707        2.0680274E-05
29.22589        2.3614130E-05
29.39758        1.9770696E-05
29.52399        1.8744957E-05
29.66627        1.6331083E-05
29.81800        1.7407390E-05
29.91182        1.5943802E-05
30.00336        1.5024363E-05
30.12525        1.9755280E-05
30.37688        2.1682617E-05
30.60363        2.2993747E-05
30.79341        2.4128996E-05
30.97461        2.5648102E-05
31.13073        2.5891148E-05
31.26193        2.4573364E-05
31.50844        2.6205269E-05
```

| | |
|---|---|
| 31.84469 | 2.4136521E-05 |
| 31.97589 | 2.3836332E-05 |
| 32.18346 | 2.8564800E-05 |
| 32.30235 | 3.1321109E-05 |
| 32.42525 | 3.2180378E-05 |
| 32.58421 | 3.4748748E-05 |
| 32.78179 | 3.3323355E-05 |
| 32.95143 | 3.1843145E-05 |
| 33.17928 | 2.7691329E-05 |
| 33.37284 | 2.9219942E-05 |
| 33.61947 | 3.0070956E-05 |
| 33.94834 | 3.2175740E-05 |
| 34.27724 | 3.4600806E-05 |
| 34.58897 | 3.2752450E-05 |
| 34.72400 | 3.4276742E-05 |
| 34.95217 | 3.3871394E-05 |
| 35.25562 | 3.6749359E-05 |
| 35.45329 | 3.7873971E-05 |
| 35.88576 | 3.8089474E-05 |
| 36.16578 | 3.8849699E-05 |
| 36.32878 | 3.6721161E-05 |
| 36.66291 | 3.4476801E-05 |
| 36.78308 | 3.6208905E-05 |
| 37.11049 | 3.7871134E-05 |
| 37.48493 | 4.1473268E-05 |
| 37.68554 | 4.2633859E-05 |
| 38.25081 | 4.8099340E-05 |
| 39.00181 | 5.0345730E-05 |
| 39.86115 | 5.3954114E-05 |
| 40.27755 | 5.4952889E-05 |
| 40.83318 | 5.7649497E-05 |
| 41.25254 | 5.9801278E-05 |
| 41.76591 | 6.7207584E-05 |
| 42.27051 | 7.0853028E-05 |
| 42.54718 | 6.8713023E-05 |
| 42.88615 | 7.3297815E-05 |
| 43.29356 | 7.5601696E-05 |
| 43.68134 | 7.9602592E-05 |
| 44.40952 | 9.0290872E-05 |
| 45.68718 | 1.1660739E-04 |
| IN 718 1200F | R=0.50 |
| 81 0.50 | |
| 16.26015 | 3.9262127E-06 |
| 16.45657 | 4.2621477E-06 |
| 16.67182 | 4.5767711E-06 |
| 17.07905 | 5.1115021E-06 |
| 17.32133 | 5.5799042E-06 |
| 17.49597 | 5.6787153E-06 |
| 17.77078 | 6.1254827E-06 |
| 18.10201 | 6.1552960E-06 |
| 18.57576 | 5.9843828E-06 |
| 18.79165 | 5.9780950E-06 |
| 18.93759 | 6.6652938E-06 |
| 18.98514 | 6.5151958E-06 |

| | |
|---|---|
| 19.04827 | 6.6352386E-06 |
| 19.81951 | 1.3688890E-05 |
| 20.17444 | 1.0990672E-05 |
| 20.45852 | 6.4551682E-06 |
| 20.66438 | 3.7373277E-06 |
| 20.62990 | 1.9800168E-06 |
| 20.30280 | 4.0556074E-06 |
| 20.76352 | 8.8122652E-06 |
| 20.88280 | 8.6325290E-06 |
| 21.11331 | 9.1667798E-06 |
| 21.27290 | 9.6620761E-06 |
| 21.60443 | 9.8418068E-06 |
| 21.76226 | 9.8523797E-06 |
| 21.86716 | 9.7010125E-06 |
| 22.11894 | 1.0144651E-05 |
| 22.32392 | 9.8284918E-06 |
| 22.52926 | 1.0068749E-05 |
| 22.73556 | 1.0899630E-05 |
| 22.96220 | 1.1892004E-05 |
| 23.17138 | 1.1901209E-05 |
| 23.34521 | 1.2062170E-05 |
| 23.48926 | 1.2362027E-05 |
| 23.75911 | 1.1824555E-05 |
| 23.94229 | 1.1952456E-05 |
| 24.14355 | 1.2892498E-05 |
| 24.40446 | 1.3017670E-05 |
| 24.61538 | 1.3468428E-05 |
| 24.78034 | 1.3789941E-05 |
| 25.11017 | 1.5408845E-05 |
| 25.24848 | 1.6852166E-05 |
| 25.51501 | 1.7076798E-05 |
| 25.70332 | 1.8120727E-05 |
| 25.90279 | 1.7599441E-05 |
| 26.18563 | 1.7330274E-05 |
| 26.30258 | 1.7511404E-05 |
| 26.58441 | 1.9039158E-05 |
| 26.74544 | 2.0154203E-05 |
| 26.90702 | 2.0589405E-05 |
| 27.16782 | 2.1546995E-05 |
| 27.33065 | 2.1655400E-05 |
| 27.54719 | 2.1291464E-05 |
| 27.76915 | 2.1643531E-05 |
| 27.90303 | 2.1966855E-05 |
| 28.16090 | 2.3776205E-05 |
| 28.36324 | 2.5533331E-05 |
| 28.54615 | 2.4830057E-05 |
| 28.73815 | 2.6296919E-05 |
| 28.90283 | 2.6824237E-05 |
| 29.19908 | 2.7241680E-05 |
| 29.59660 | 2.8782286E-05 |
| 29.85490 | 3.1074058E-05 |
| 30.41652 | 3.6263686E-05 |
| 30.84043 | 3.6103982E-05 |
| 31.11146 | 3.5522295E-05 |

| | |
|---|---|
| 31.28746 | 3.7009948E-05 |
| 31.63894 | 3.5406239E-05 |
| 31.81690 | 3.2854681E-05 |
| 32.16970 | 3.3236400E-05 |
| 32.61694 | 3.5551227E-05 |
| 32.98472 | 3.7506132E-05 |
| 33.29748 | 3.9616210E-05 |
| 33.64482 | 4.3420769E-05 |
| 34.07959 | 4.2647232E-05 |
| 34.51037 | 4.5260549E-05 |
| 34.78811 | 4.8167698E-05 |
| 35.36721 | 5.1327450E-05 |
| 35.44781 | 5.2038456E-05 |
| 36.51294 | 6.0314305E-05 |
| 36.85562 | 6.5650020E-05 |

4) DAMINYDKC.DAT - Yield Strength and Fracture Toughness Data

```
IN 718  Temperature vs. % Room Temperature Fty and Kc
9
78      1.00    1.00
200     0.97    1.01
400     0.95    1.03
600     0.93    1.05
800     0.91    1.07
1000    0.89    1.10
1200    0.81    1.12
1400    0.54    1.14
1600    0.30    1.16
```

5) DAMINEFYD.DAT - Effective Yield Strength Data

```
IN 718  Larson-Miller Data
24 25
14.0  1.0
16.0  1.0
18.0  0.99
20.0  0.96
22.0  0.92
24.0  0.90
26.0  0.83
28.0  0.78
30.0  0.72
32.0  0.67
34.0  0.60
36.0  0.53
38.0  0.48
40.0  0.42
42.0  0.38
44.0  0.32
46.0  0.29
48.0  0.25
50.0  0.22
52.0  0.19
54.0  0.16
56.0  0.12
58.0  0.10
60.0  0.08
```

6) DAMINRSO.DAT - Overload Shut-Off Ratio Data

```
IN 718  RSO
2
78.0  1.00
1200.0  0.7083
```

## APPENDIX C

## ADVANCED FIGHTER LOAD AND TEMPERATURE SPECTRUM

There are 1000 missions in the advanced fighter spectrum. Each mission contains 16 load cycles and lasts for 1 hour. The temperature profile for each mission is the same. However, the peak and valley loads change from mission to mission.

Peak and valley loads were distributed to resemble the exceedance curve of a current Air Force fighter. The exceedance curve has 16,000 load cycles per 1000 flight hours, and a mission length of one hour. Therefore, each mission should have 16 load cycles. These 16 cycles were divided among seven mission segments. Ranges for both peak and valley loads were then assigned to these segments. One thousand missions which identify actual peak and valley loads, were defined by randomly assigning loads within each defined range. The number of loads in each mission segment were counted to tailor the load-time profile to meet the exceedance curve. This method results in a slightly sequenced load history in which all of the loads above 100 percent limit load occur in the first 400 missions.

On the following pages, the full spectrum is listed for the first mission. Peak and valley loads are then listed for each cycle in all 1000 missions in terms of percent test load.

1 mission - 60 minutes (16 load cycles)

| Step # | Peak (%) | Valley (%) | # of cycles | Temperature (F) | Cycle Time (sec) | Total Time (sec) |
|---|---|---|---|---|---|---|
| 1 | 54.1 | 2.8 | 1 | 78.0 | 300.00 | 300.00 |
| 2 | 36.5 | 13.5 | 1 | 610.0 | 400.00 | 700.00 |
| 3 | 40.3 | 14.3 | 1 | 600.0 | 400.00 | 1100.00 |
| 4 | 48.3 | 3.4 | 1 | 590.0 | 400.00 | 1500.00 |
| 5 | 58.3 | 13.7 | 1 | 650.0 | 67.50 | 1567.50 |
| 6 | 56.3 | 16.1 | 1 | 700.0 | 67.50 | 1635.00 |
| 7 | 68.9 | 7.2 | 1 | 750.0 | 67.50 | 1702.50 |
| 8 | 72.1 | 11.0 | 1 | 800.0 | 67.50 | 1770.00 |
| 9 | 84.8 | -21.0 | 1 | 300.0 | 60.00 | 1830.00 |
| 10 | 65.2 | 4.0 | 1 | 780.0 | 67.50 | 1897.50 |
| 11 | 59.6 | 7.9 | 1 | 750.0 | 67.50 | 1965.00 |
| 12 | 79.7 | 3.2 | 1 | 780.0 | 67.50 | 2032.50 |
| 13 | 51.8 | 14.8 | 1 | 750.0 | 67.50 | 2100.00 |
| 14 | 34.1 | 7.1 | 1 | 590.0 | 600.00 | 2700.00 |
| 15 | 38.7 | 19.7 | 1 | 610.0 | 600.00 | 3300.00 |
| 16 | 76.6 | 0.4 | 1 | 78.0 | 300.00 | 3600.00 |

Figure C-1. Table of Peak and Valley Loads for First Advanced Fighter Mission

Figure C-2. Table of Peak Loads for Advanced Fighter Spectrum

| | peak loads for cycle # | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 1 | 54.1 | 36.5 | 40.3 | 48.3 | 58.3 | 56.3 | 68.9 | 72.1 | 84.8 | 65.2 | 59.6 | 79.7 | 51.8 | 34.1 | 38.7 | 76.6 |
| 2 | 50.6 | 25.0 | 49.1 | 45.5 | 69.0 | 55.5 | 77.9 | 60.8 | 108.1 | 65.0 | 77.5 | 52.7 | 60.8 | 38.5 | 33.8 | 56.6 |
| 3 | 64.4 | 27.1 | 38.2 | 49.5 | 75.5 | 83.5 | 58.6 | 58.6 | 89.8 | 65.9 | 59.7 | 70.7 | 55.0 | 33.1 | 34.5 | 78.2 |
| 4 | 61.9 | 41.5 | 28.7 | 41.4 | 73.4 | 57.3 | 63.8 | 52.3 | 84.4 | 75.7 | 56.8 | 63.2 | 59.9 | 30.5 | 36.2 | 67.7 |
| 5 | 63.9 | 44.9 | 29.6 | 32.6 | 63.7 | 69.2 | 83.4 | 62.5 | 84.1 | 60.9 | 79.3 | 64.5 | 72.4 | 43.8 | 31.2 | 63.6 |
| 6 | 79.7 | 43.1 | 45.0 | 28.6 | 80.3 | 73.2 | 56.0 | 58.7 | 82.1 | 69.2 | 76.8 | 50.4 | 55.1 | 38.4 | 41.1 | 54.0 |
| 7 | 72.0 | 47.6 | 32.7 | 43.1 | 79.0 | 62.5 | 54.0 | 83.5 | 101.2 | 50.9 | 67.8 | 74.8 | 50.6 | 33.5 | 49.9 | 53.5 |
| 8 | 70.7 | 27.1 | 36.3 | 37.3 | 70.9 | 71.9 | 50.2 | 62.9 | 82.0 | 71.4 | 58.7 | 77.2 | 56.3 | 28.7 | 36.6 | 59.5 |
| 9 | 77.8 | 34.3 | 43.5 | 33.7 | 80.5 | 74.6 | 68.4 | 70.4 | 86.5 | 72.2 | 53.2 | 78.9 | 78.3 | 30.2 | 33.3 | 69.9 |
| 10 | 61.2 | 32.3 | 43.6 | 30.3 | 69.7 | 54.7 | 54.6 | 67.1 | 81.6 | 53.5 | 61.8 | 50.5 | 65.8 | 28.1 | 32.6 | 69.4 |
| 11 | 69.6 | 46.2 | 35.6 | 39.6 | 70.6 | 79.1 | 62.5 | 61.2 | 107.4 | 75.7 | 51.4 | 78.2 | 56.0 | 47.3 | 45.6 | 76.6 |
| 12 | 76.7 | 39.5 | 35.8 | 27.8 | 74.4 | 54.9 | 54.9 | 57.7 | 95.6 | 51.7 | 74.0 | 51.1 | 77.7 | 49.2 | 35.0 | 70.6 |
| 13 | 65.5 | 41.1 | 35.6 | 28.5 | 59.7 | 81.6 | 54.4 | 78.1 | 108.1 | 78.1 | 66.9 | 67.9 | 56.4 | 33.6 | 47.5 | 68.4 |
| 14 | 52.7 | 46.3 | 34.3 | 32.3 | 55.9 | 68.1 | 84.4 | 75.2 | 85.4 | 77.6 | 71.3 | 63.7 | 78.1 | 39.9 | 46.6 | 51.2 |
| 15 | 53.1 | 43.8 | 47.4 | 25.4 | 66.7 | 50.2 | 75.1 | 57.4 | 85.0 | 70.8 | 62.3 | 67.2 | 54.2 | 48.7 | 45.9 | 71.7 |
| 16 | 73.9 | 41.9 | 38.5 | 28.9 | 63.3 | 52.4 | 84.2 | 74.1 | 99.6 | 57.8 | 78.0 | 67.1 | 75.4 | 33.7 | 41.4 | 60.7 |
| 17 | 79.3 | 45.6 | 27.9 | 37.7 | 83.4 | 55.4 | 63.1 | 59.6 | 86.1 | 50.4 | 78.6 | 59.2 | 76.3 | 37.7 | 44.6 | 54.3 |
| 18 | 74.7 | 32.6 | 25.2 | 34.9 | 84.0 | 67.9 | 77.7 | 63.2 | 98.6 | 70.4 | 63.3 | 61.9 | 61.3 | 41.5 | 34.1 | 57.8 |
| 19 | 57.5 | 29.7 | 25.5 | 44.6 | 80.6 | 78.9 | 59.1 | 58.8 | 99.2 | 69.1 | 59.7 | 69.1 | 75.8 | 34.8 | 28.9 | 72.3 |
| 20 | 66.5 | 34.0 | 26.0 | 40.0 | 60.9 | 81.2 | 81.0 | 57.6 | 93.7 | 52.8 | 57.9 | 76.8 | 73.0 | 26.9 | 42.8 | 75.5 |
| 21 | 60.2 | 27.0 | 49.0 | 40.9 | 65.6 | 80.7 | 59.4 | 67.9 | 87.1 | 68.0 | 75.2 | 76.3 | 52.6 | 47.0 | 25.2 | 63.4 |
| 22 | 73.5 | 47.6 | 40.9 | 44.2 | 54.8 | 80.0 | 83.9 | 59.3 | 107.9 | 74.2 | 74.8 | 77.1 | 76.5 | 49.3 | 48.6 | 54.6 |
| 23 | 71.7 | 25.1 | 44.4 | 46.6 | 68.7 | 73.2 | 53.7 | 57.9 | 100.6 | 51.4 | 59.5 | 77.4 | 56.5 | 30.9 | 26.6 | 53.0 |
| 24 | 71.2 | 25.6 | 45.0 | 48.3 | 83.0 | 54.1 | 62.3 | 72.9 | 92.1 | 77.5 | 65.7 | 64.9 | 64.2 | 45.6 | 34.2 | 78.9 |
| 25 | 59.4 | 41.2 | 41.6 | 29.3 | 55.3 | 70.6 | 75.7 | 64.5 | 98.3 | 74.8 | 67.8 | 79.5 | 69.9 | 42.9 | 27.8 | 51.3 |
| 26 | 63.6 | 28.9 | 41.7 | 26.4 | 75.7 | 69.7 | 65.7 | 50.5 | 99.9 | 66.8 | 62.8 | 64.8 | 72.6 | 32.1 | 41.0 | 59.7 |
| 27 | 70.4 | 49.4 | 31.5 | 34.3 | 62.7 | 56.9 | 73.6 | 73.6 | 87.9 | 75.3 | 64.5 | 79.9 | 78.8 | 46.6 | 29.4 | 66.0 |
| 28 | 65.3 | 31.8 | 46.7 | 32.2 | 54.4 | 80.8 | 63.7 | 63.8 | 110.1 | 77.2 | 68.0 | 61.6 | 51.6 | 32.6 | 41.2 | 56.2 |
| 29 | 72.1 | 37.1 | 42.2 | 35.8 | 79.2 | 78.5 | 56.6 | 50.5 | 106.8 | 51.4 | 73.9 | 66.0 | 71.6 | 38.4 | 37.6 | 72.6 |
| 30 | 71.9 | 47.5 | 37.9 | 48.4 | 61.9 | 69.3 | 52.3 | 59.5 | 96.6 | 55.6 | 52.7 | 60.5 | 74.5 | 28.2 | 37.8 | 65.2 |
| 31 | 73.0 | 30.4 | 38.7 | 37.6 | 79.6 | 70.2 | 59.3 | 80.4 | 82.7 | 63.1 | 59.4 | 75.5 | 71.3 | 46.6 | 39.7 | 74.1 |
| 32 | 59.8 | 27.6 | 30.1 | 37.0 | 57.5 | 80.0 | 52.6 | 68.8 | 98.5 | 69.9 | 77.7 | 56.5 | 67.6 | 32.3 | 39.7 | 50.9 |
| 33 | 62.4 | 44.2 | 48.3 | 47.6 | 60.0 | 64.4 | 72.2 | 53.3 | 113.4 | 51.5 | 74.3 | 76.0 | 73.1 | 32.3 | 28.7 | 71.2 |
| 34 | 75.9 | 37.7 | 25.5 | 39.5 | 56.7 | 80.5 | 76.7 | 67.9 | 114.6 | 69.6 | 53.5 | 65.1 | 50.7 | 41.0 | 36.7 | 65.6 |
| 35 | 70.1 | 32.1 | 35.2 | 28.2 | 72.9 | 51.5 | 76.5 | 84.1 | 81.8 | 79.4 | 51.3 | 55.5 | 76.1 | 39.0 | 28.7 | 62.4 |
| 36 | 58.3 | 31.9 | 38.0 | 26.5 | 61.2 | 66.4 | 57.4 | 82.8 | 104.1 | 65.7 | 70.0 | 61.6 | 76.9 | 32.5 | 49.5 | 68.9 |
| 37 | 77.1 | 36.2 | 26.0 | 45.9 | 51.9 | 84.7 | 79.0 | 57.1 | 110.6 | 69.7 | 75.0 | 70.8 | 67.4 | 48.3 | 39.9 | 76.3 |
| 38 | 77.2 | 30.0 | 35.5 | 36.0 | 67.2 | 75.4 | 83.0 | 51.1 | 107.2 | 70.8 | 51.4 | 58.9 | 69.6 | 30.3 | 28.5 | 74.6 |
| 39 | 70.2 | 31.9 | 37.1 | 39.0 | 79.7 | 76.3 | 58.1 | 59.7 | 96.0 | 56.6 | 66.3 | 54.4 | 56.2 | 31.9 | 48.5 | 64.2 |
| 40 | 70.3 | 39.0 | 44.4 | 32.0 | 81.8 | 73.1 | 66.5 | 55.6 | 100.3 | 70.2 | 76.6 | 68.4 | 51.8 | 25.1 | 25.2 | 76.0 |
| 41 | 60.8 | 44.4 | 44.8 | 44.5 | 76.3 | 80.0 | 80.1 | 64.6 | 99.0 | 64.6 | 79.3 | 69.5 | 55.8 | 46.4 | 40.9 | 63.2 |
| 42 | 67.5 | 26.6 | 41.0 | 32.3 | 65.3 | 82.0 | 71.6 | 65.3 | 106.0 | 56.6 | 66.3 | 62.7 | 79.6 | 26.0 | 27.2 | 62.6 |
| 43 | 77.2 | 42.0 | 26.8 | 41.7 | 82.0 | 74.9 | 61.4 | 75.0 | 90.4 | 77.4 | 76.8 | 71.2 | 53.2 | 46.6 | 36.3 | 74.9 |
| 44 | 61.3 | 41.4 | 33.9 | 43.7 | 51.2 | 80.7 | 73.3 | 71.1 | 104.5 | 76.4 | 52.7 | 76.7 | 56.0 | 49.9 | 42.2 | 59.6 |
| 45 | 64.4 | 29.5 | 44.7 | 36.5 | 60.1 | 58.0 | 63.9 | 76.3 | 107.9 | 64.7 | 70.4 | 66.3 | 51.7 | 40.5 | 42.0 | 64.0 |
| 46 | 65.5 | 45.0 | 40.4 | 37.9 | 73.1 | 61.0 | 64.0 | 81.1 | 93.0 | 68.2 | 56.9 | 61.1 | 69.4 | 29.1 | 49.4 | 62.8 |
| 47 | 58.5 | 48.8 | 39.9 | 33.2 | 53.2 | 50.5 | 51.6 | 77.8 | 95.7 | 63.3 | 77.3 | 61.1 | 64.1 | 41.1 | 35.6 | 66.8 |
| 48 | 69.4 | 48.4 | 25.9 | 39.7 | 77.6 | 65.7 | 77.6 | 65.9 | 95.7 | 76.6 | 72.0 | 54.0 | 77.7 | 27.9 | 47.9 | 55.2 |
| 49 | 57.8 | 38.6 | 40.0 | 47.9 | 70.6 | 78.1 | 65.3 | 50.2 | 81.6 | 62.1 | 51.4 | 50.8 | 77.1 | 29.0 | 34.8 | 64.2 |
| 50 | 70.6 | 47.3 | 41.2 | 36.2 | 55.2 | 72.6 | 70.6 | 55.5 | 108.2 | 66.7 | 63.9 | 69.2 | 67.7 | 35.0 | 33.9 | 57.1 |
| 51 | 54.6 | 43.8 | 42.4 | 39.6 | 51.8 | 65.6 | 52.0 | 50.3 | 108.7 | 67.1 | 54.3 | 53.5 | 71.6 | 28.5 | 39.6 | 78.3 |
| 52 | 68.8 | 31.6 | 40.1 | 48.3 | 64.0 | 61.6 | 56.8 | 72.7 | 104.2 | 69.3 | 54.0 | 79.8 | 78.7 | 36.6 | 27.2 | 58.1 |
| 53 | 57.1 | 35.0 | 39.8 | 35.7 | 82.3 | 72.0 | 71.5 | 61.4 | 99.1 | 54.3 | 57.5 | 72.4 | 63.0 | 38.5 | 38.8 | 77.2 |
| 54 | 76.1 | 31.2 | 31.6 | 49.5 | 70.8 | 79.3 | 61.0 | 69.5 | 104.6 | 66.6 | 75.6 | 65.4 | 75.6 | 31.9 | 37.3 | 68.6 |
| 55 | 75.4 | 43.6 | 32.4 | 26.7 | 61.9 | 52.1 | 73.0 | 82.5 | 111.1 | 68.4 | 59.4 | 63.5 | 72.4 | 25.6 | 47.6 | 70.3 |
| 56 | 68.3 | 39.2 | 26.1 | 45.6 | 55.0 | 82.1 | 73.5 | 63.9 | 114.0 | 66.9 | 55.9 | 77.5 | 65.1 | 29.4 | 43.3 | 76.1 |
| 57 | 71.9 | 47.1 | 34.6 | 28.3 | 81.7 | 52.7 | 63.9 | 84.9 | 105.5 | 64.7 | 63.3 | 67.2 | 79.8 | 48.3 | 47.5 | 54.9 |
| 58 | 75.3 | 47.0 | 47.4 | 48.2 | 61.7 | 83.0 | 61.8 | 67.2 | 80.7 | 55.9 | 66.6 | 68.1 | 52.6 | 28.4 | 31.1 | 59.4 |
| 59 | 57.9 | 31.7 | 35.1 | 36.7 | 66.5 | 68.2 | 58.5 | 73.1 | 99.5 | 59.0 | 70.7 | 58.6 | 55.7 | 47.6 | 26.1 | 59.3 |
| 60 | 71.4 | 41.0 | 47.8 | 49.1 | 71.0 | 76.8 | 63.7 | 63.5 | 106.3 | 71.3 | 59.4 | 65.1 | 54.4 | 31.5 | 39.6 | 76.7 |
| 61 | 69.0 | 42.0 | 34.0 | 33.9 | 68.1 | 54.7 | 83.7 | 71.7 | 105.3 | 75.1 | 72.8 | 52.5 | 52.3 | 33.0 | 46.7 | 59.8 |
| 62 | 66.3 | 35.6 | 26.1 | 43.5 | 67.9 | 80.2 | 52.0 | 69.3 | 89.2 | 63.5 | 50.7 | 52.5 | 70.5 | 37.8 | 47.4 | 75.0 |
| 63 | 70.4 | 32.2 | 46.8 | 49.3 | 62.6 | 60.8 | 61.8 | 55.6 | 88.0 | 51.9 | 66.4 | 65.4 | 63.7 | 25.4 | 29.2 | 77.1 |
| 64 | 65.9 | 28.4 | 25.8 | 43.9 | 51.2 | 51.4 | 53.8 | 70.9 | 110.1 | 78.4 | 74.4 | 54.0 | 60.3 | 38.0 | 32.8 | 64.6 |
| 65 | 64.9 | 31.9 | 41.3 | 25.8 | 54.1 | 77.2 | 73.1 | 76.8 | 96.2 | 70.6 | 75.9 | 63.8 | 79.5 | 36.1 | 30.5 | 63.8 |
| 66 | 78.2 | 44.1 | 31.6 | 46.3 | 83.3 | 51.4 | 62.0 | 67.0 | 112.9 | 70.9 | 78.8 | 72.7 | 75.9 | 37.4 | 38.8 | 65.4 |
| 67 | 56.6 | 47.5 | 25.4 | 48.4 | 68.7 | 53.7 | 77.1 | 57.2 | 93.2 | 56.7 | 78.6 | 60.5 | 68.7 | 46.5 | 48.9 | 63.2 |
| 68 | 60.7 | 29.3 | 28.4 | 29.2 | 68.3 | 62.8 | 78.7 | 72.3 | 82.3 | 61.6 | 75.1 | 51.9 | 78.9 | 35.1 | 32.4 | 72.2 |
| 69 | 61.3 | 30.9 | 32.1 | 35.7 | 80.5 | 80.3 | 76.1 | 51.5 | 94.9 | 69.7 | 69.1 | 59.1 | 69.0 | 48.5 | 29.8 | 71.3 |
| 70 | 61.1 | 28.4 | 47.4 | 50.0 | 78.5 | 65.7 | 65.2 | 84.4 | 99.7 | 77.6 | 73.2 | 61.5 | 58.9 | 34.1 | 28.2 | 52.2 |
| 71 | 55.1 | 34.5 | 36.5 | 46.7 | 81.2 | 69.5 | 77.4 | 75.7 | 87.9 | 67.1 | 61.2 | 52.7 | 60.0 | 42.2 | 43.3 | 66.3 |
| 72 | 54.2 | 49.9 | 45.6 | 31.6 | 76.9 | 60.8 | 84.9 | 79.3 | 101.5 | 66.4 | 67.9 | 57.3 | 69.3 | 28.4 | 28.0 | 61.3 |
| 73 | 50.5 | 40.4 | 38.0 | 31.0 | 51.7 | 69.0 | 82.3 | 73.2 | 86.7 | 62.7 | 77.7 | 57.9 | 64.6 | 29.8 | 30.0 | 78.6 |
| 74 | 70.9 | 37.7 | 26.8 | 30.5 | 53.0 | 81.3 | 62.3 | 84.2 | 97.4 | 52.7 | 64.4 | 68.2 | 68.1 | 36.7 | 28.5 | 67.5 |
| 75 | 72.6 | 46.9 | 47.3 | 44.1 | 63.1 | 83.2 | 67.7 | 64.3 | 102.6 | 61.3 | 64.1 | 65.7 | 54.0 | 33.3 | 39.6 | 71.7 |

| mission | peak loads for cycle # 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76 | 71.2 | 35.9 | 36.5 | 25.8 | 79.3 | 65.9 | 53.7 | 56.6 | 95.6 | 71.9 | 70.6 | 72.4 | 55.5 | 48.9 | 28.0 | 69.5 |
| 77 | 60.2 | 49.4 | 31.1 | 37.8 | 64.3 | 82.4 | 81.2 | 52.5 | 113.9 | 69.6 | 61.3 | 71.9 | 73.0 | 39.5 | 42.4 | 71.4 |
| 78 | 70.8 | 28.2 | 41.4 | 40.3 | 68.2 | 79.3 | 71.3 | 53.7 | 83.9 | 70.8 | 79.3 | 54.2 | 71.1 | 45.5 | 38.6 | 65.7 |
| 79 | 67.0 | 35.1 | 30.1 | 44.8 | 55.1 | 68.0 | 72.0 | 77.0 | 96.6 | 62.4 | 75.7 | 68.7 | 72.2 | 40.7 | 43.9 | 62.6 |
| 80 | 75.3 | 31.1 | 36.6 | 25.1 | 70.6 | 59.0 | 61.0 | 64.9 | 89.7 | 77.3 | 76.0 | 68.2 | 65.5 | 39.5 | 38.1 | 78.3 |
| 81 | 55.6 | 32.5 | 32.5 | 43.1 | 56.8 | 56.6 | 73.2 | 53.3 | 105.8 | 79.2 | 51.9 | 79.0 | 68.9 | 32.7 | 39.0 | 78.6 |
| 82 | 67.1 | 41.4 | 37.1 | 25.2 | 64.7 | 60.1 | 53.5 | 64.1 | 85.9 | 66.4 | 68.0 | 71.7 | 75.8 | 39.0 | 49.6 | 52.6 |
| 83 | 67.0 | 42.0 | 48.3 | 40.1 | 60.4 | 78.5 | 58.4 | 67.0 | 98.3 | 69.1 | 76.2 | 59.6 | 56.3 | 49.1 | 45.0 | 67.2 |
| 84 | 58.7 | 32.3 | 35.9 | 45.8 | 56.8 | 70.3 | 64.3 | 74.1 | 81.0 | 75.8 | 60.6 | 74.8 | 70.9 | 40.0 | 34.2 | 69.4 |
| 85 | 55.9 | 47.4 | 28.1 | 31.5 | 82.0 | 80.8 | 53.6 | 73.9 | 106.9 | 66.6 | 65.5 | 67.0 | 79.9 | 26.5 | 34.8 | 77.6 |
| 86 | 53.4 | 25.4 | 38.0 | 45.5 | 53.8 | 52.2 | 63.7 | 79.5 | 112.9 | 61.5 | 70.6 | 60.2 | 58.9 | 29.0 | 41.5 | 64.0 |
| 87 | 59.7 | 44.1 | 37.4 | 40.0 | 75.8 | 56.3 | 66.3 | 67.5 | 100.7 | 77.8 | 62.9 | 63.5 | 67.3 | 37.4 | 26.8 | 54.3 |
| 88 | 68.7 | 27.4 | 47.8 | 26.4 | 57.2 | 55.7 | 81.8 | 72.3 | 100.7 | 79.0 | 57.9 | 64.8 | 79.1 | 31.9 | 43.2 | 63.3 |
| 89 | 54.5 | 47.3 | 38.1 | 26.6 | 61.2 | 67.8 | 73.0 | 55.5 | 81.4 | 57.6 | 57.8 | 57.8 | 62.3 | 45.5 | 30.7 | 52.1 |
| 90 | 55.0 | 25.9 | 32.3 | 36.5 | 53.8 | 62.7 | 60.8 | 65.7 | 82.8 | 67.0 | 60.8 | 58.4 | 64.0 | 40.0 | 37.1 | 50.9 |
| 91 | 65.5 | 46.6 | 26.2 | 45.2 | 77.2 | 84.8 | 83.3 | 59.9 | 97.3 | 76.2 | 53.8 | 77.8 | 63.5 | 47.0 | 46.1 | 74.1 |
| 92 | 78.1 | 33.4 | 28.9 | 28.6 | 51.4 | 72.5 | 53.4 | 50.5 | 104.1 | 58.4 | 69.3 | 74.3 | 56.5 | 35.7 | 45.5 | 51.5 |
| 93 | 67.9 | 48.6 | 44.8 | 27.5 | 56.9 | 56.4 | 84.9 | 83.3 | 84.2 | 56.2 | 61.2 | 62.0 | 80.0 | 49.7 | 39.4 | 79.5 |
| 94 | 50.8 | 29.0 | 32.1 | 40.6 | 62.9 | 72.2 | 75.4 | 55.7 | 80.3 | 60.7 | 66.5 | 64.5 | 52.1 | 34.5 | 29.7 | 55.9 |
| 95 | 74.7 | 25.7 | 39.4 | 35.5 | 72.5 | 76.9 | 82.5 | 78.8 | 107.5 | 56.3 | 50.7 | 59.6 | 78.8 | 36.2 | 26.6 | 74.2 |
| 96 | 69.7 | 29.4 | 44.2 | 32.5 | 55.9 | 54.4 | 71.8 | 74.8 | 89.5 | 79.0 | 56.2 | 68.8 | 72.8 | 48.9 | 28.4 | 56.4 |
| 97 | 60.5 | 41.2 | 45.4 | 42.8 | 56.7 | 78.1 | 80.2 | 69.1 | 82.8 | 74.6 | 78.7 | 51.9 | 74.4 | 37.9 | 29.0 | 57.5 |
| 98 | 79.7 | 44.8 | 28.6 | 34.6 | 57.9 | 79.6 | 76.7 | 61.1 | 107.0 | 57.4 | 58.3 | 71.5 | 61.5 | 27.4 | 25.8 | 58.3 |
| 99 | 50.6 | 33.1 | 32.2 | 47.0 | 51.9 | 68.6 | 64.7 | 52.7 | 101.9 | 64.1 | 63.2 | 72.9 | 63.8 | 27.5 | 38.4 | 78.1 |
| 100 | 55.2 | 46.3 | 27.3 | 49.8 | 84.7 | 65.7 | 63.8 | 79.0 | 92.6 | 67.6 | 78.4 | 64.4 | 60.1 | 41.7 | 29.5 | 53.8 |
| 101 | 57.6 | 44.7 | 33.3 | 35.1 | 51.6 | 75.4 | 79.6 | 63.0 | 106.2 | 53.6 | 55.6 | 67.7 | 66.5 | 36.2 | 37.9 | 74.8 |
| 102 | 59.9 | 42.4 | 41.4 | 43.3 | 73.3 | 51.9 | 56.2 | 51.2 | 92.4 | 70.2 | 55.4 | 71.8 | 79.2 | 31.1 | 37.1 | 52.2 |
| 103 | 70.2 | 43.0 | 27.9 | 34.1 | 51.4 | 84.5 | 68.3 | 57.9 | 95.4 | 58.9 | 75.4 | 77.5 | 64.0 | 47.5 | 46.8 | 54.9 |
| 104 | 54.2 | 49.5 | 36.3 | 28.2 | 81.7 | 65.4 | 52.7 | 57.4 | 110.9 | 77.3 | 78.6 | 54.7 | 78.5 | 25.9 | 43.3 | 56.8 |
| 105 | 62.9 | 34.8 | 41.4 | 41.5 | 78.7 | 76.4 | 80.8 | 60.8 | 114.5 | 56.0 | 70.4 | 51.1 | 69.6 | 38.7 | 45.3 | 53.3 |
| 106 | 73.1 | 28.7 | 47.4 | 40.4 | 53.0 | 51.3 | 72.2 | 72.9 | 115.0 | 50.3 | 55.8 | 75.0 | 64.2 | 25.8 | 28.2 | 60.2 |
| 107 | 73.0 | 28.6 | 30.0 | 39.2 | 50.3 | 75.2 | 67.4 | 54.3 | 95.3 | 69.5 | 57.1 | 56.5 | 64.0 | 35.9 | 40.2 | 74.3 |
| 108 | 66.9 | 37.7 | 45.8 | 28.5 | 61.8 | 73.4 | 68.2 | 84.5 | 96.1 | 70.7 | 72.4 | 70.4 | 57.0 | 49.8 | 33.4 | 71.9 |
| 109 | 63.9 | 37.2 | 46.3 | 35.1 | 52.4 | 55.8 | 67.2 | 56.2 | 105.5 | 50.1 | 53.0 | 54.2 | 57.4 | 42.2 | 35.4 | 53.8 |
| 110 | 71.4 | 44.4 | 39.8 | 38.7 | 60.6 | 67.3 | 51.0 | 79.4 | 106.0 | 74.7 | 62.3 | 67.7 | 50.9 | 46.5 | 28.9 | 57.5 |
| 111 | 56.5 | 47.0 | 35.5 | 45.4 | 55.2 | 81.5 | 60.2 | 52.3 | 94.2 | 76.6 | 64.2 | 60.8 | 73.6 | 29.2 | 25.5 | 50.8 |
| 112 | 79.4 | 31.6 | 30.5 | 47.5 | 52.7 | 58.3 | 58.5 | 53.0 | 80.2 | 70.0 | 79.0 | 70.6 | 59.9 | 48.4 | 41.8 | 67.4 |
| 113 | 55.1 | 25.9 | 33.3 | 49.0 | 78.3 | 62.9 | 84.4 | 57.3 | 105.6 | 71.5 | 79.7 | 66.2 | 57.1 | 48.4 | 28.1 | 69.7 |
| 114 | 57.1 | 47.0 | 34.3 | 38.8 | 63.4 | 59.6 | 83.5 | 75.7 | 80.4 | 74.6 | 52.3 | 70.2 | 51.8 | 25.4 | 34.9 | 64.6 |
| 115 | 67.0 | 39.2 | 34.9 | 30.1 | 84.7 | 61.8 | 59.6 | 53.5 | 95.8 | 78.6 | 55.8 | 76.4 | 52.7 | 44.4 | 31.0 | 66.6 |
| 116 | 64.3 | 46.9 | 35.5 | 34.7 | 65.9 | 67.3 | 69.2 | 73.7 | 109.1 | 64.2 | 65.7 | 70.2 | 58.5 | 46.8 | 46.0 | 68.4 |
| 117 | 78.7 | 30.7 | 42.3 | 36.7 | 81.8 | 60.4 | 75.6 | 77.6 | 108.2 | 75.8 | 69.8 | 52.7 | 58.9 | 41.0 | 33.8 | 56.5 |
| 118 | 62.8 | 44.5 | 45.4 | 41.1 | 65.0 | 51.9 | 61.3 | 59.3 | 83.1 | 72.8 | 68.8 | 50.9 | 65.3 | 25.5 | 28.3 | 58.4 |
| 119 | 79.9 | 42.5 | 34.7 | 38.6 | 60.5 | 50.7 | 52.0 | 71.7 | 88.8 | 73.2 | 79.7 | 69.7 | 57.8 | 43.8 | 41.3 | 67.1 |
| 120 | 66.8 | 26.6 | 42.0 | 38.9 | 84.1 | 84.7 | 84.7 | 80.5 | 98.5 | 58.5 | 58.4 | 52.5 | 65.0 | 26.0 | 27.5 | 72.9 |
| 121 | 75.6 | 47.8 | 30.2 | 39.6 | 56.1 | 67.3 | 65.6 | 54.7 | 88.9 | 64.6 | 76.3 | 60.9 | 50.3 | 37.2 | 37.0 | 54.3 |
| 122 | 78.7 | 49.9 | 39.8 | 37.2 | 80.5 | 63.6 | 76.4 | 72.3 | 106.1 | 72.2 | 61.1 | 60.7 | 78.0 | 25.2 | 27.2 | 61.6 |
| 123 | 69.9 | 38.2 | 36.0 | 48.6 | 56.7 | 84.1 | 76.4 | 64.7 | 83.4 | 52.9 | 52.8 | 54.7 | 53.2 | 45.9 | 32.2 | 79.6 |
| 124 | 67.0 | 49.7 | 29.3 | 40.0 | 59.2 | 78.6 | 73.9 | 77.0 | 100.1 | 70.2 | 72.9 | 73.3 | 66.8 | 28.2 | 27.1 | 58.7 |
| 125 | 51.7 | 38.0 | 42.1 | 45.1 | 58.1 | 64.8 | 71.2 | 83.5 | 85.9 | 70.0 | 60.6 | 62.8 | 60.4 | 48.0 | 39.4 | 71.0 |
| 126 | 74.5 | 45.1 | 38.1 | 30.6 | 52.1 | 54.7 | 68.1 | 72.4 | 83.5 | 61.8 | 61.1 | 77.5 | 78.0 | 25.0 | 41.3 | 70.8 |
| 127 | 71.7 | 43.8 | 49.5 | 26.5 | 79.2 | 60.2 | 67.6 | 83.7 | 108.7 | 78.4 | 52.8 | 62.4 | 61.7 | 48.9 | 41.6 | 53.6 |
| 128 | 53.6 | 45.1 | 33.4 | 49.6 | 59.6 | 51.7 | 70.0 | 75.7 | 92.7 | 58.5 | 70.4 | 66.1 | 78.2 | 32.3 | 34.3 | 59.1 |
| 129 | 68.7 | 31.6 | 28.3 | 35.3 | 56.4 | 56.8 | 59.3 | 75.6 | 94.1 | 51.7 | 73.7 | 61.4 | 67.9 | 41.1 | 36.8 | 79.7 |
| 130 | 56.1 | 45.1 | 32.2 | 48.4 | 60.0 | 70.6 | 56.2 | 62.0 | 90.8 | 65.2 | 62.3 | 70.9 | 78.7 | 33.8 | 42.8 | 63.9 |
| 131 | 62.7 | 34.4 | 40.1 | 30.0 | 62.3 | 56.1 | 51.4 | 53.1 | 101.7 | 56.3 | 63.3 | 70.3 | 67.6 | 40.5 | 49.1 | 68.7 |
| 132 | 52.1 | 48.3 | 42.2 | 28.4 | 67.4 | 51.3 | 79.7 | 71.5 | 91.9 | 77.9 | 75.6 | 66.1 | 65.6 | 42.1 | 39.6 | 65.3 |
| 133 | 53.7 | 46.2 | 31.8 | 48.5 | 71.5 | 58.2 | 83.2 | 77.6 | 95.0 | 73.3 | 58.0 | 60.7 | 66.4 | 48.7 | 44.5 | 61.1 |
| 134 | 78.7 | 46.3 | 37.6 | 26.6 | 72.3 | 52.6 | 68.8 | 68.2 | 98.4 | 60.5 | 54.9 | 63.2 | 63.8 | 32.0 | 26.6 | 65.0 |
| 135 | 59.2 | 36.8 | 41.6 | 47.2 | 68.7 | 62.3 | 53.3 | 65.2 | 97.5 | 53.0 | 77.2 | 80.0 | 69.3 | 36.7 | 40.7 | 67.3 |
| 136 | 70.5 | 31.4 | 49.1 | 30.5 | 58.8 | 72.6 | 51.3 | 64.3 | 105.6 | 76.4 | 62.8 | 78.7 | 69.2 | 36.7 | 30.7 | 52.7 |
| 137 | 53.9 | 31.7 | 44.9 | 45.1 | 77.3 | 74.9 | 68.3 | 54.0 | 107.0 | 52.9 | 68.9 | 64.7 | 62.8 | 40.5 | 43.4 | 67.8 |
| 138 | 69.0 | 42.3 | 43.1 | 27.2 | 72.7 | 71.9 | 56.5 | 56.1 | 93.4 | 68.5 | 71.4 | 73.5 | 53.1 | 26.4 | 40.2 | 58.1 |
| 139 | 66.7 | 45.7 | 34.0 | 35.5 | 64.2 | 80.2 | 74.7 | 50.6 | 101.8 | 61.1 | 61.8 | 54.8 | 66.0 | 46.5 | 38.1 | 60.0 |
| 140 | 56.5 | 47.2 | 34.5 | 27.8 | 81.7 | 82.5 | 58.7 | 60.5 | 104.8 | 73.9 | 55.5 | 74.0 | 74.2 | 28.1 | 25.1 | 54.8 |
| 141 | 51.5 | 48.9 | 42.7 | 25.3 | 71.6 | 67.3 | 64.2 | 83.3 | 80.2 | 71.8 | 65.8 | 74.3 | 77.2 | 29.7 | 41.3 | 75.3 |
| 142 | 55.2 | 45.0 | 37.0 | 31.7 | 79.9 | 63.1 | 71.1 | 73.1 | 98.6 | 76.0 | 52.4 | 56.7 | 54.5 | 43.2 | 42.9 | 60.8 |
| 143 | 61.2 | 26.0 | 39.6 | 29.6 | 56.7 | 82.7 | 73.7 | 63.4 | 98.7 | 73.6 | 50.8 | 62.9 | 50.8 | 31.7 | 47.0 | 77.7 |
| 144 | 75.5 | 25.8 | 40.1 | 26.5 | 58.9 | 82.6 | 58.7 | 78.4 | 82.3 | 55.4 | 77.0 | 67.3 | 65.2 | 35.5 | 40.7 | 76.7 |
| 145 | 63.4 | 35.5 | 38.7 | 34.7 | 68.6 | 73.7 | 57.8 | 63.5 | 80.7 | 79.9 | 58.3 | 69.4 | 79.1 | 29.2 | 47.5 | 73.2 |
| 146 | 55.4 | 44.7 | 25.9 | 36.5 | 76.3 | 72.9 | 63.9 | 85.0 | 93.2 | 65.0 | 55.3 | 65.3 | 57.8 | 25.1 | 47.6 | 58.4 |
| 147 | 58.8 | 45.4 | 31.8 | 40.5 | 59.8 | 61.4 | 52.8 | 53.6 | 81.7 | 54.4 | 51.2 | 77.6 | 57.1 | 40.6 | 45.8 | 72.4 |
| 148 | 55.8 | 46.9 | 45.1 | 41.9 | 79.9 | 72.6 | 84.1 | 52.3 | 89.2 | 78.7 | 65.7 | 50.7 | 57.5 | 32.6 | 29.6 | 59.4 |
| 149 | 59.8 | 48.6 | 25.8 | 35.0 | 75.1 | 69.6 | 67.5 | 51.3 | 93.9 | 67.5 | 61.2 | 77.3 | 50.7 | 41.1 | 48.7 | 55.2 |
| 150 | 56.6 | 43.1 | 42.8 | 39.2 | 57.7 | 61.8 | 83.0 | 81.5 | 103.1 | 59.1 | 79.0 | 79.2 | 59.3 | 25.0 | 40.7 | 50.7 |

peak loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 151 | 76.2 | 39.2 | 27.2 | 42.3 | 68.4 | 71.1 | 57.4 | 75.4 | 93.7 | 54.1 | 77.5 | 58.1 | 78.9 | 47.5 | 30.6 | 79.1 |
| 152 | 70.0 | 45.3 | 39.2 | 38.9 | 66.2 | 83.8 | 50.2 | 55.2 | 98.9 | 73.9 | 70.6 | 51.0 | 75.1 | 43.2 | 34.8 | 79.9 |
| 153 | 68.7 | 48.7 | 37.7 | 45.6 | 72.7 | 54.3 | 62.6 | 64.6 | 90.8 | 53.5 | 71.2 | 69.3 | 54.6 | 28.8 | 32.9 | 71.4 |
| 154 | 66.2 | 36.9 | 28.5 | 30.2 | 58.1 | 55.9 | 79.1 | 64.3 | 92.9 | 77.1 | 51.8 | 77.9 | 76.9 | 31.4 | 42.5 | 64.6 |
| 155 | 58.9 | 46.6 | 45.5 | 36.8 | 62.1 | 67.5 | 67.2 | 84.5 | 84.8 | 76.0 | 61.1 | 65.6 | 62.5 | 43.5 | 34.2 | 67.0 |
| 156 | 67.4 | 28.1 | 38.7 | 29.4 | 66.0 | 68.6 | 72.3 | 58.5 | 91.0 | 58.1 | 62.6 | 71.3 | 60.4 | 32.4 | 27.6 | 56.2 |
| 157 | 70.9 | 28.2 | 32.1 | 40.0 | 52.1 | 65.6 | 63.3 | 54.7 | 92.1 | 58.9 | 76.3 | 76.5 | 67.2 | 27.1 | 44.1 | 72.1 |
| 158 | 55.1 | 32.2 | 26.3 | 48.5 | 59.8 | 58.7 | 54.7 | 56.0 | 98.9 | 75.4 | 76.6 | 71.2 | 61.8 | 46.8 | 42.4 | 70.1 |
| 159 | 61.0 | 31.3 | 26.8 | 36.1 | 57.5 | 55.3 | 55.5 | 71.7 | 99.5 | 71.1 | 59.9 | 77.0 | 69.6 | 43.2 | 28.8 | 63.4 |
| 160 | 60.8 | 35.7 | 44.7 | 47.0 | 81.6 | 60.5 | 63.6 | 84.8 | 82.1 | 69.9 | 62.2 | 52.1 | 58.0 | 28.1 | 37.8 | 65.2 |
| 161 | 63.2 | 30.6 | 25.6 | 39.8 | 63.8 | 81.0 | 59.4 | 84.8 | 88.9 | 58.4 | 68.5 | 71.2 | 52.0 | 48.2 | 43.4 | 59.4 |
| 162 | 57.5 | 31.1 | 35.0 | 31.8 | 53.1 | 72.2 | 66.8 | 74.3 | 89.3 | 72.3 | 67.6 | 64.8 | 60.6 | 49.0 | 42.7 | 54.8 |
| 163 | 62.1 | 34.6 | 43.3 | 30.3 | 81.0 | 71.5 | 71.7 | 83.3 | 103.6 | 78.1 | 76.8 | 76.8 | 73.0 | 25.3 | 37.0 | 57.0 |
| 164 | 66.9 | 32.9 | 32.6 | 43.8 | 67.7 | 75.4 | 59.0 | 60.6 | 99.4 | 51.5 | 78.4 | 55.5 | 57.8 | 42.0 | 35.4 | 59.8 |
| 165 | 69.5 | 26.0 | 40.5 | 34.4 | 61.9 | 57.0 | 76.0 | 52.1 | 103.7 | 69.3 | 51.3 | 54.2 | 53.0 | 34.2 | 45.7 | 77.3 |
| 166 | 62.6 | 37.9 | 31.5 | 30.8 | 66.1 | 64.3 | 57.6 | 50.3 | 102.9 | 69.9 | 72.0 | 53.5 | 65.8 | 25.2 | 27.9 | 71.8 |
| 167 | 76.3 | 35.3 | 36.7 | 34.9 | 73.6 | 73.1 | 66.7 | 52.8 | 103.9 | 56.2 | 62.4 | 71.1 | 54.1 | 32.8 | 29.0 | 68.8 |
| 168 | 79.7 | 34.4 | 36.2 | 31.8 | 54.5 | 71.7 | 72.7 | 84.7 | 90.9 | 77.7 | 76.7 | 76.7 | 53.5 | 46.8 | 26.7 | 53.1 |
| 169 | 71.8 | 29.7 | 38.8 | 28.2 | 80.5 | 67.9 | 70.1 | 63.0 | 99.2 | 50.3 | 60.2 | 78.7 | 50.6 | 49.7 | 27.5 | 56.9 |
| 170 | 56.2 | 37.2 | 34.1 | 44.7 | 82.1 | 57.1 | 75.1 | 63.1 | 89.9 | 77.0 | 71.3 | 79.5 | 61.1 | 47.6 | 33.4 | 76.4 |
| 171 | 73.9 | 47.0 | 34.4 | 36.5 | 83.6 | 76.4 | 64.9 | 75.3 | 83.2 | 77.6 | 73.9 | 73.0 | 71.8 | 45.4 | 32.8 | 53.9 |
| 172 | 60.5 | 35.8 | 31.0 | 34.1 | 65.6 | 76.1 | 77.1 | 67.5 | 90.8 | 54.0 | 69.6 | 64.0 | 61.8 | 33.2 | 47.2 | 51.2 |
| 173 | 68.6 | 28.5 | 46.0 | 26.4 | 76.6 | 55.4 | 54.7 | 51.8 | 96.1 | 79.6 | 79.6 | 67.7 | 74.9 | 27.7 | 37.1 | 53.7 |
| 174 | 78.4 | 41.0 | 33.7 | 37.7 | 60.4 | 62.2 | 73.5 | 69.3 | 87.0 | 76.3 | 64.1 | 79.0 | 55.6 | 34.5 | 43.3 | 52.4 |
| 175 | 52.9 | 29.0 | 40.0 | 28.0 | 78.3 | 73.8 | 74.3 | 73.6 | 82.9 | 75.6 | 50.2 | 67.7 | 66.2 | 43.5 | 46.2 | 79.9 |
| 176 | 69.1 | 36.3 | 46.2 | 39.7 | 70.8 | 57.3 | 76.2 | 80.1 | 100.0 | 51.7 | 51.0 | 63.9 | 74.4 | 26.5 | 31.9 | 51.8 |
| 177 | 64.8 | 35.0 | 34.1 | 39.3 | 79.5 | 77.6 | 58.6 | 69.4 | 82.1 | 59.1 | 71.9 | 66.5 | 51.6 | 38.8 | 37.9 | 75.9 |
| 178 | 58.8 | 25.6 | 32.6 | 49.9 | 54.2 | 55.9 | 84.4 | 79.0 | 80.6 | 50.6 | 70.8 | 59.4 | 56.2 | 40.6 | 36.9 | 54.0 |
| 179 | 55.9 | 26.5 | 46.6 | 26.9 | 70.8 | 77.6 | 62.1 | 68.6 | 101.6 | 79.4 | 78.2 | 57.6 | 68.9 | 28.4 | 45.8 | 64.7 |
| 180 | 57.3 | 34.9 | 33.1 | 46.0 | 75.1 | 58.8 | 72.1 | 64.2 | 99.8 | 63.3 | 65.8 | 73.0 | 63.9 | 39.4 | 30.5 | 57.5 |
| 181 | 72.4 | 28.6 | 32.4 | 49.0 | 76.4 | 56.3 | 74.4 | 67.7 | 92.6 | 56.1 | 70.0 | 71.8 | 54.6 | 31.6 | 31.4 | 69.5 |
| 182 | 76.6 | 30.8 | 37.5 | 29.9 | 50.3 | 74.3 | 63.4 | 75.7 | 82.7 | 55.3 | 58.3 | 62.7 | 69.9 | 39.4 | 30.1 | 69.4 |
| 183 | 51.1 | 30.6 | 44.0 | 47.3 | 53.4 | 75.5 | 51.1 | 68.1 | 92.8 | 59.9 | 55.1 | 61.7 | 53.2 | 26.2 | 42.6 | 78.8 |
| 184 | 61.3 | 39.1 | 32.3 | 30.5 | 80.5 | 52.9 | 75.1 | 71.4 | 97.9 | 79.9 | 57.6 | 60.1 | 58.5 | 30.0 | 33.7 | 56.7 |
| 185 | 66.0 | 26.1 | 28.2 | 32.8 | 61.3 | 68.5 | 74.1 | 73.4 | 83.0 | 78.8 | 72.2 | 75.9 | 50.4 | 39.2 | 45.1 | 61.5 |
| 186 | 50.7 | 27.1 | 40.1 | 39.3 | 70.0 | 80.0 | 51.7 | 58.3 | 99.4 | 54.4 | 79.8 | 71.0 | 51.1 | 39.5 | 49.0 | 64.5 |
| 187 | 75.6 | 45.6 | 31.5 | 40.0 | 54.7 | 65.6 | 57.9 | 69.6 | 100.0 | 52.2 | 58.0 | 72.0 | 50.3 | 29.8 | 44.6 | 71.9 |
| 188 | 61.7 | 48.4 | 45.0 | 26.6 | 84.0 | 60.5 | 68.7 | 51.4 | 92.7 | 79.5 | 61.6 | 50.5 | 56.9 | 36.4 | 38.4 | 65.6 |
| 189 | 63.0 | 31.0 | 46.7 | 34.3 | 72.9 | 68.7 | 71.8 | 74.8 | 85.7 | 56.4 | 69.1 | 60.9 | 67.3 | 48.7 | 48.6 | 63.3 |
| 190 | 66.5 | 43.9 | 37.8 | 44.8 | 68.8 | 67.4 | 67.6 | 81.2 | 104.4 | 72.2 | 62.1 | 78.5 | 55.2 | 48.4 | 31.5 | 63.4 |
| 191 | 64.9 | 28.7 | 27.5 | 33.6 | 64.9 | 73.9 | 74.1 | 57.9 | 90.8 | 70.7 | 53.9 | 70.8 | 75.9 | 36.2 | 29.8 | 69.5 |
| 192 | 68.2 | 46.1 | 40.6 | 29.0 | 77.8 | 56.2 | 75.2 | 65.2 | 82.0 | 59.2 | 54.7 | 57.3 | 67.1 | 45.9 | 46.6 | 70.1 |
| 193 | 57.4 | 33.7 | 32.8 | 30.5 | 67.0 | 67.4 | 74.2 | 76.8 | 85.8 | 56.8 | 50.6 | 64.2 | 62.8 | 32.7 | 26.6 | 77.2 |
| 194 | 73.3 | 45.6 | 36.1 | 39.3 | 80.9 | 61.8 | 82.3 | 67.8 | 104.8 | 64.6 | 62.9 | 79.5 | 71.0 | 45.3 | 48.5 | 58.3 |
| 195 | 55.2 | 36.2 | 32.1 | 45.5 | 72.2 | 77.7 | 64.9 | 73.6 | 83.5 | 69.6 | 62.2 | 70.9 | 67.4 | 32.8 | 33.3 | 55.8 |
| 196 | 58.9 | 37.5 | 43.6 | 33.7 | 51.1 | 66.0 | 51.9 | 66.6 | 87.8 | 72.6 | 52.5 | 55.5 | 62.9 | 45.3 | 42.2 | 65.2 |
| 197 | 54.8 | 41.2 | 31.7 | 38.1 | 73.4 | 81.5 | 54.0 | 74.8 | 103.9 | 61.4 | 69.5 | 65.5 | 53.8 | 34.6 | 33.4 | 62.0 |
| 198 | 63.0 | 42.9 | 40.0 | 25.4 | 66.3 | 75.9 | 59.6 | 62.8 | 104.4 | 70.8 | 61.1 | 54.0 | 78.9 | 30.9 | 44.4 | 77.3 |
| 199 | 76.7 | 32.6 | 37.6 | 45.9 | 60.9 | 75.1 | 75.5 | 60.0 | 93.9 | 72.9 | 57.0 | 78.0 | 53.9 | 27.6 | 49.9 | 64.6 |
| 200 | 57.3 | 44.7 | 34.0 | 25.3 | 73.3 | 57.4 | 68.4 | 62.3 | 84.3 | 57.3 | 57.8 | 72.7 | 52.8 | 43.6 | 42.4 | 61.2 |
| 201 | 52.1 | 25.2 | 48.9 | 33.3 | 66.1 | 83.1 | 58.8 | 72.3 | 91.1 | 67.5 | 50.2 | 54.2 | 59.1 | 31.9 | 45.4 | 72.4 |
| 202 | 52.6 | 40.9 | 47.5 | 34.0 | 82.2 | 71.4 | 69.3 | 62.1 | 104.1 | 78.1 | 74.4 | 54.2 | 70.2 | 47.7 | 36.2 | 58.8 |
| 203 | 75.6 | 29.1 | 48.3 | 26.7 | 63.9 | 84.0 | 84.7 | 62.8 | 95.1 | 64.8 | 56.4 | 65.7 | 76.9 | 41.0 | 26.7 | 51.0 |
| 204 | 60.9 | 45.3 | 45.4 | 39.2 | 76.8 | 74.4 | 69.8 | 75.5 | 94.9 | 70.8 | 53.2 | 56.9 | 71.3 | 40.5 | 29.0 | 69.2 |
| 205 | 53.9 | 42.4 | 42.5 | 33.5 | 78.8 | 71.6 | 74.2 | 67.2 | 96.1 | 55.6 | 66.0 | 73.0 | 56.5 | 25.7 | 33.6 | 79.2 |
| 206 | 50.4 | 44.6 | 49.5 | 46.4 | 66.1 | 81.4 | 56.5 | 67.2 | 100.7 | 73.1 | 59.4 | 57.1 | 56.5 | 34.3 | 43.9 | 57.0 |
| 207 | 51.1 | 49.0 | 43.3 | 30.4 | 81.1 | 59.5 | 55.3 | 61.8 | 84.8 | 78.8 | 62.9 | 61.2 | 68.2 | 35.3 | 49.9 | 75.9 |
| 208 | 72.6 | 31.5 | 28.7 | 30.5 | 73.1 | 77.6 | 51.8 | 71.1 | 89.4 | 58.6 | 70.0 | 61.7 | 56.7 | 45.8 | 28.2 | 50.9 |
| 209 | 76.8 | 45.5 | 44.9 | 31.3 | 66.4 | 77.9 | 75.0 | 65.0 | 93.1 | 67.4 | 74.7 | 53.0 | 78.3 | 49.6 | 29.5 | 67.7 |
| 210 | 64.1 | 25.2 | 33.7 | 26.7 | 61.1 | 71.5 | 79.2 | 71.2 | 81.6 | 56.1 | 71.6 | 51.4 | 60.0 | 36.1 | 36.8 | 54.2 |
| 211 | 73.6 | 33.3 | 40.8 | 31.1 | 62.5 | 71.6 | 83.9 | 54.1 | 87.3 | 79.0 | 53.4 | 54.5 | 75.0 | 25.9 | 47.8 | 72.0 |
| 212 | 60.9 | 43.2 | 49.1 | 26.4 | 84.1 | 70.1 | 60.1 | 72.8 | 97.6 | 64.0 | 53.4 | 71.4 | 64.3 | 25.2 | 43.4 | 75.8 |
| 213 | 77.8 | 31.0 | 25.8 | 38.5 | 52.4 | 52.6 | 52.4 | 78.3 | 82.4 | 69.4 | 59.8 | 71.6 | 79.7 | 49.7 | 49.1 | 59.5 |
| 214 | 60.7 | 27.4 | 44.5 | 35.5 | 71.3 | 64.8 | 64.8 | 58.1 | 104.5 | 72.0 | 55.2 | 73.0 | 50.5 | 27.4 | 35.6 | 67.8 |
| 215 | 69.8 | 29.5 | 35.1 | 29.1 | 72.2 | 83.2 | 74.8 | 68.5 | 104.9 | 55.1 | 70.0 | 56.1 | 68.8 | 28.1 | 39.5 | 63.6 |
| 216 | 51.6 | 31.3 | 32.0 | 29.8 | 61.6 | 70.7 | 62.5 | 69.5 | 93.9 | 58.2 | 50.6 | 75.1 | 65.2 | 35.1 | 29.0 | 52.4 |
| 217 | 55.5 | 38.6 | 28.3 | 35.2 | 55.2 | 78.7 | 62.4 | 82.9 | 82.8 | 50.2 | 78.9 | 77.4 | 60.6 | 35.9 | 38.6 | 58.9 |
| 218 | 69.8 | 38.3 | 42.9 | 25.8 | 54.3 | 63.3 | 52.9 | 72.4 | 91.1 | 65.5 | 74.1 | 77.1 | 60.4 | 48.2 | 48.5 | 55.6 |
| 219 | 64.2 | 40.3 | 40.9 | 36.7 | 51.0 | 84.8 | 54.9 | 52.9 | 81.0 | 68.0 | 76.0 | 71.5 | 57.2 | 27.3 | 43.4 | 69.1 |
| 220 | 66.4 | 25.9 | 43.6 | 26.3 | 79.6 | 60.6 | 56.4 | 72.0 | 84.9 | 61.2 | 79.0 | 70.3 | 67.8 | 35.3 | 31.3 | 58.7 |
| 221 | 54.3 | 29.2 | 33.2 | 35.9 | 50.6 | 71.7 | 66.1 | 76.6 | 87.1 | 59.8 | 60.8 | 54.3 | 79.0 | 45.1 | 38.0 | 54.7 |
| 222 | 64.0 | 33.3 | 48.3 | 48.3 | 64.3 | 60.0 | 80.8 | 58.6 | 93.0 | 78.6 | 60.8 | 64.5 | 79.1 | 46.3 | 34.1 | 71.0 |
| 223 | 75.8 | 47.7 | 48.5 | 31.9 | 72.1 | 78.8 | 84.5 | 57.9 | 102.3 | 71.7 | 60.5 | 50.3 | 60.3 | 25.9 | 34.2 | 62.0 |
| 224 | 60.0 | 47.4 | 44.3 | 49.8 | 66.7 | 66.9 | 59.6 | 64.0 | 89.7 | 78.8 | 55.2 | 51.5 | 62.4 | 45.2 | 39.5 | 74.2 |
| 225 | 71.9 | 48.4 | 49.8 | 38.6 | 71.8 | 61.0 | 69.4 | 66.4 | 81.8 | 68.0 | 50.8 | 79.7 | 63.1 | 25.9 | 31.2 | 64.1 |

peak loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 226 | 57.4 | 34.1 | 30.8 | 39.1 | 56.5 | 59.7 | 62.5 | 50.9 | 92.6 | 51.7 | 72.6 | 78.1 | 59.5 | 45.6 | 46.3 | 72.4 |
| 227 | 54.3 | 43.2 | 41.1 | 43.0 | 81.7 | 71.8 | 71.4 | 74.6 | 88.6 | 65.3 | 69.9 | 59.1 | 63.9 | 46.1 | 34.9 | 73.5 |
| 228 | 68.5 | 40.3 | 35.0 | 49.5 | 61.4 | 64.3 | 50.5 | 66.3 | 92.0 | 67.1 | 72.4 | 67.9 | 71.0 | 43.1 | 43.4 | 52.4 |
| 229 | 62.4 | 45.3 | 31.9 | 27.7 | 73.3 | 68.0 | 78.1 | 50.4 | 90.5 | 60.9 | 58.9 | 53.2 | 55.9 | 28.4 | 31.1 | 60.4 |
| 230 | 64.2 | 47.6 | 42.1 | 35.5 | 74.0 | 68.8 | 79.6 | 59.5 | 82.7 | 62.2 | 77.9 | 59.8 | 59.9 | 45.1 | 30.8 | 62.0 |
| 231 | 65.7 | 44.5 | 39.3 | 48.1 | 83.4 | 77.4 | 79.5 | 74.2 | 102.7 | 69.6 | 53.5 | 60.6 | 75.7 | 43.6 | 30.2 | 71.4 |
| 232 | 71.1 | 43.6 | 28.9 | 37.8 | 51.7 | 60.0 | 63.0 | 82.9 | 92.6 | 68.8 | 57.2 | 68.0 | 67.8 | 47.5 | 33.9 | 75.9 |
| 233 | 64.0 | 33.8 | 43.7 | 39.4 | 80.6 | 51.0 | 75.0 | 80.0 | 81.7 | 75.2 | 53.9 | 64.7 | 71.9 | 33.0 | 30.2 | 61.1 |
| 234 | 59.3 | 25.9 | 39.5 | 32.3 | 72.3 | 58.2 | 51.2 | 50.1 | 82.9 | 65.2 | 61.0 | 71.1 | 75.4 | 45.8 | 27.3 | 73.4 |
| 235 | 61.7 | 36.1 | 32.1 | 26.3 | 52.3 | 78.0 | 63.3 | 57.9 | 81.3 | 69.2 | 51.3 | 71.8 | 67.8 | 37.3 | 46.5 | 66.4 |
| 236 | 56.5 | 41.2 | 33.5 | 40.1 | 70.4 | 80.8 | 58.6 | 77.9 | 88.1 | 52.3 | 71.5 | 71.7 | 60.6 | 43.6 | 29.2 | 77.5 |
| 237 | 79.3 | 44.0 | 25.6 | 46.0 | 77.7 | 70.3 | 77.1 | 77.7 | 97.9 | 50.5 | 73.6 | 69.5 | 65.9 | 31.9 | 46.5 | 51.1 |
| 238 | 59.4 | 44.7 | 35.0 | 33.2 | 73.9 | 54.6 | 77.5 | 72.4 | 80.7 | 79.9 | 57.5 | 71.1 | 50.8 | 26.1 | 33.3 | 56.9 |
| 239 | 66.5 | 26.8 | 44.9 | 29.4 | 71.8 | 80.4 | 67.2 | 52.9 | 105.0 | 58.7 | 64.6 | 68.8 | 75.0 | 47.9 | 29.3 | 55.4 |
| 240 | 52.9 | 36.5 | 26.8 | 42.1 | 56.1 | 62.3 | 61.6 | 63.6 | 84.2 | 72.8 | 76.7 | 56.8 | 76.1 | 27.1 | 45.6 | 77.3 |
| 241 | 52.8 | 30.9 | 41.3 | 28.0 | 79.1 | 54.0 | 77.3 | 81.8 | 101.6 | 58.3 | 77.7 | 65.7 | 57.9 | 31.7 | 45.8 | 79.5 |
| 242 | 55.0 | 36.4 | 42.4 | 45.7 | 65.0 | 60.7 | 82.7 | 78.0 | 81.7 | 73.7 | 71.5 | 56.5 | 69.2 | 39.2 | 32.8 | 55.6 |
| 243 | 77.5 | 40.1 | 29.3 | 27.8 | 51.3 | 69.3 | 83.3 | 67.1 | 98.2 | 62.4 | 78.6 | 76.3 | 73.1 | 41.5 | 32.6 | 75.4 |
| 244 | 62.7 | 30.5 | 37.7 | 28.2 | 51.3 | 58.7 | 72.2 | 80.4 | 103.0 | 76.5 | 53.3 | 50.5 | 51.4 | 40.3 | 40.4 | 52.0 |
| 245 | 57.9 | 37.8 | 43.7 | 46.9 | 55.2 | 72.9 | 52.2 | 77.8 | 82.4 | 73.1 | 55.5 | 53.1 | 53.6 | 47.2 | 44.1 | 75.7 |
| 246 | 55.1 | 26.4 | 43.9 | 38.0 | 77.4 | 68.8 | 67.2 | 84.9 | 94.6 | 70.0 | 63.0 | 67.4 | 72.2 | 43.4 | 38.0 | 66.0 |
| 247 | 54.0 | 32.8 | 48.5 | 48.5 | 51.4 | 68.3 | 52.4 | 58.4 | 89.3 | 71.9 | 70.2 | 77.9 | 77.4 | 44.7 | 49.6 | 50.9 |
| 248 | 69.5 | 28.6 | 33.7 | 26.2 | 54.9 | 78.4 | 83.1 | 71.1 | 84.7 | 61.4 | 68.7 | 64.7 | 52.6 | 33.6 | 32.1 | 63.8 |
| 249 | 60.5 | 36.2 | 31.9 | 29.5 | 59.8 | 57.0 | 78.8 | 69.6 | 80.3 | 62.6 | 55.3 | 74.1 | 51.2 | 30.4 | 47.7 | 79.2 |
| 250 | 63.3 | 43.1 | 27.7 | 35.9 | 77.6 | 68.8 | 55.4 | 68.5 | 100.1 | 64.0 | 54.8 | 70.7 | 54.9 | 37.3 | 46.9 | 78.7 |
| 251 | 54.2 | 37.2 | 34.8 | 35.5 | 51.1 | 51.0 | 68.8 | 61.3 | 87.3 | 67.6 | 57.7 | 63.4 | 53.5 | 42.2 | 41.3 | 63.1 |
| 252 | 58.7 | 28.4 | 38.9 | 31.0 | 54.5 | 64.3 | 61.8 | 67.4 | 83.5 | 66.0 | 65.8 | 74.8 | 50.8 | 44.0 | 42.9 | 77.2 |
| 253 | 74.1 | 37.0 | 27.2 | 31.0 | 54.0 | 80.5 | 81.1 | 52.6 | 82.3 | 70.7 | 69.8 | 70.2 | 62.0 | 31.7 | 47.5 | 62.3 |
| 254 | 59.4 | 50.0 | 38.3 | 36.1 | 65.2 | 68.6 | 61.4 | 60.0 | 80.4 | 52.9 | 71.8 | 62.4 | 60.3 | 30.3 | 37.1 | 60.5 |
| 255 | 60.5 | 44.4 | 32.7 | 43.4 | 74.4 | 78.7 | 69.9 | 70.7 | 104.4 | 52.4 | 61.1 | 63.6 | 60.9 | 43.9 | 27.5 | 53.3 |
| 256 | 64.0 | 45.6 | 35.7 | 39.7 | 71.9 | 76.6 | 83.4 | 73.4 | 83.6 | 73.3 | 53.4 | 64.6 | 63.1 | 43.9 | 41.9 | 56.5 |
| 257 | 54.6 | 30.6 | 29.2 | 47.8 | 52.4 | 74.0 | 80.1 | 56.0 | 92.1 | 59.3 | 64.8 | 77.3 | 70.6 | 46.4 | 38.3 | 63.0 |
| 258 | 74.1 | 25.8 | 33.5 | 26.7 | 65.1 | 68.2 | 55.2 | 51.8 | 101.6 | 73.7 | 64.3 | 54.9 | 74.4 | 38.5 | 34.7 | 58.9 |
| 259 | 50.9 | 32.3 | 43.9 | 46.7 | 52.6 | 68.7 | 62.0 | 80.2 | 102.0 | 59.5 | 51.0 | 55.7 | 55.7 | 30.9 | 37.3 | 68.7 |
| 260 | 65.0 | 47.2 | 44.2 | 33.2 | 59.4 | 55.8 | 59.6 | 57.4 | 88.7 | 77.9 | 62.6 | 67.0 | 74.4 | 37.2 | 34.1 | 65.0 |
| 261 | 72.3 | 44.5 | 48.8 | 43.4 | 67.6 | 77.7 | 69.6 | 75.1 | 91.3 | 67.1 | 74.7 | 63.2 | 58.8 | 26.0 | 47.2 | 58.1 |
| 262 | 54.6 | 48.9 | 40.2 | 32.1 | 62.0 | 78.4 | 71.7 | 62.3 | 89.8 | 76.0 | 71.1 | 76.9 | 58.3 | 32.1 | 30.2 | 65.2 |
| 263 | 53.1 | 34.7 | 43.1 | 35.1 | 69.9 | 76.4 | 71.7 | 76.4 | 95.3 | 74.8 | 77.6 | 71.6 | 57.0 | 39.7 | 41.5 | 56.3 |
| 264 | 71.6 | 31.3 | 36.6 | 33.3 | 61.2 | 63.0 | 68.7 | 67.6 | 104.1 | 74.4 | 66.5 | 70.0 | 77.4 | 27.6 | 32.7 | 77.4 |
| 265 | 65.7 | 30.0 | 46.4 | 43.3 | 62.0 | 79.8 | 71.0 | 75.7 | 88.5 | 75.6 | 73.2 | 63.7 | 73.6 | 25.6 | 48.9 | 79.7 |
| 266 | 59.6 | 34.2 | 42.5 | 40.5 | 68.9 | 51.3 | 52.3 | 76.9 | 94.5 | 73.8 | 68.3 | 73.9 | 70.7 | 33.5 | 32.5 | 66.6 |
| 267 | 61.8 | 40.7 | 43.4 | 43.0 | 77.1 | 68.1 | 53.1 | 58.6 | 101.6 | 65.0 | 51.9 | 71.9 | 71.7 | 39.3 | 42.3 | 56.9 |
| 268 | 61.6 | 31.3 | 49.2 | 28.0 | 76.5 | 79.3 | 53.8 | 75.8 | 96.6 | 77.7 | 79.7 | 54.2 | 70.4 | 39.9 | 32.4 | 71.7 |
| 269 | 66.8 | 35.4 | 46.9 | 26.8 | 56.0 | 63.1 | 73.3 | 63.2 | 94.1 | 76.6 | 58.5 | 76.9 | 58.0 | 36.9 | 31.2 | 50.7 |
| 270 | 76.7 | 29.4 | 35.9 | 36.2 | 55.2 | 73.6 | 68.9 | 62.2 | 80.2 | 53.0 | 69.4 | 50.8 | 75.4 | 33.0 | 30.9 | 53.9 |
| 271 | 71.4 | 46.5 | 29.1 | 50.0 | 62.0 | 70.5 | 58.1 | 71.6 | 97.8 | 57.0 | 71.7 | 65.8 | 54.8 | 37.4 | 25.9 | 71.2 |
| 272 | 69.6 | 41.5 | 33.5 | 46.5 | 52.0 | 70.3 | 61.9 | 74.0 | 87.1 | 74.1 | 63.6 | 61.3 | 53.7 | 29.0 | 29.2 | 77.9 |
| 273 | 58.7 | 44.2 | 29.5 | 31.4 | 55.4 | 67.2 | 63.5 | 56.1 | 100.3 | 66.5 | 72.3 | 72.5 | 76.9 | 35.5 | 44.8 | 62.0 |
| 274 | 53.1 | 31.6 | 50.0 | 32.2 | 61.7 | 77.4 | 51.7 | 58.9 | 99.3 | 53.2 | 64.7 | 55.8 | 61.2 | 28.0 | 32.0 | 65.5 |
| 275 | 68.9 | 26.8 | 32.9 | 35.6 | 51.2 | 50.1 | 59.2 | 63.1 | 88.9 | 54.8 | 65.5 | 55.9 | 62.8 | 38.4 | 26.0 | 55.8 |
| 276 | 72.3 | 31.2 | 36.7 | 47.3 | 76.3 | 67.2 | 82.3 | 75.8 | 91.1 | 77.1 | 52.9 | 79.7 | 68.0 | 46.0 | 46.2 | 52.9 |
| 277 | 71.1 | 32.5 | 42.7 | 43.7 | 78.7 | 56.4 | 78.3 | 54.2 | 84.7 | 54.8 | 51.0 | 56.2 | 57.4 | 30.8 | 31.5 | 55.0 |
| 278 | 58.0 | 45.8 | 48.1 | 33.9 | 67.2 | 79.1 | 80.2 | 50.8 | 87.0 | 56.9 | 60.5 | 60.6 | 72.2 | 32.6 | 39.0 | 58.2 |
| 279 | 59.8 | 34.7 | 32.9 | 30.6 | 79.6 | 64.7 | 71.7 | 65.4 | 90.6 | 58.2 | 78.2 | 58.6 | 52.7 | 30.3 | 41.6 | 53.9 |
| 280 | 72.8 | 25.2 | 25.0 | 30.5 | 74.6 | 50.6 | 60.0 | 62.3 | 103.9 | 62.9 | 77.9 | 71.4 | 56.6 | 44.4 | 32.2 | 53.8 |
| 281 | 55.3 | 35.5 | 40.8 | 48.9 | 79.6 | 67.4 | 83.1 | 61.1 | 99.1 | 76.1 | 77.0 | 58.4 | 54.6 | 32.5 | 29.2 | 57.3 |
| 282 | 66.9 | 33.5 | 31.6 | 27.0 | 58.4 | 64.9 | 61.6 | 52.1 | 94.8 | 51.4 | 73.0 | 65.7 | 58.3 | 26.3 | 33.6 | 71.8 |
| 283 | 62.3 | 33.4 | 43.9 | 45.7 | 68.8 | 80.5 | 62.2 | 75.1 | 96.8 | 59.5 | 75.5 | 79.8 | 63.8 | 49.3 | 29.6 | 64.5 |
| 284 | 66.7 | 46.3 | 40.8 | 40.9 | 62.9 | 66.9 | 59.2 | 51.6 | 100.1 | 77.8 | 62.3 | 69.4 | 57.5 | 33.8 | 41.9 | 72.8 |
| 285 | 52.4 | 36.3 | 37.9 | 49.5 | 54.0 | 63.3 | 80.4 | 66.0 | 90.6 | 77.2 | 65.9 | 56.4 | 61.8 | 43.5 | 28.5 | 52.5 |
| 286 | 59.6 | 25.9 | 38.7 | 35.4 | 68.4 | 50.4 | 77.3 | 60.8 | 104.3 | 52.2 | 60.6 | 53.7 | 76.5 | 42.8 | 42.6 | 61.7 |
| 287 | 52.8 | 29.3 | 46.2 | 42.1 | 64.0 | 55.2 | 66.4 | 58.8 | 82.1 | 66.4 | 79.2 | 61.2 | 71.3 | 38.4 | 29.7 | 62.4 |
| 288 | 65.8 | 46.5 | 39.8 | 27.4 | 53.5 | 70.1 | 79.5 | 75.4 | 98.8 | 78.6 | 53.0 | 62.3 | 76.4 | 45.4 | 41.1 | 73.0 |
| 289 | 65.9 | 49.8 | 41.4 | 26.6 | 68.4 | 59.4 | 71.3 | 77.0 | 92.7 | 69.6 | 76.5 | 73.7 | 72.7 | 37.0 | 46.5 | 66.6 |
| 290 | 76.7 | 25.0 | 29.0 | 26.1 | 68.3 | 58.7 | 71.2 | 71.4 | 84.9 | 69.8 | 65.6 | 76.7 | 57.5 | 34.7 | 38.7 | 55.6 |
| 291 | 79.4 | 49.7 | 36.9 | 38.6 | 79.8 | 60.0 | 57.7 | 75.5 | 91.8 | 64.3 | 62.0 | 76.9 | 54.4 | 33.0 | 30.5 | 50.8 |
| 292 | 70.0 | 35.2 | 48.3 | 29.6 | 72.1 | 59.2 | 56.1 | 64.4 | 89.4 | 50.4 | 65.8 | 61.3 | 62.9 | 45.9 | 32.6 | 78.4 |
| 293 | 55.8 | 39.9 | 29.0 | 31.0 | 75.2 | 68.4 | 82.6 | 69.6 | 97.9 | 59.8 | 51.8 | 50.8 | 79.6 | 32.6 | 40.0 | 74.8 |
| 294 | 73.4 | 33.5 | 32.7 | 34.7 | 80.0 | 71.9 | 71.9 | 83.4 | 88.5 | 77.2 | 75.4 | 52.4 | 57.4 | 25.9 | 26.0 | 60.1 |
| 295 | 52.1 | 25.4 | 34.0 | 33.4 | 67.8 | 73.7 | 61.3 | 76.8 | 103.9 | 72.2 | 68.5 | 77.0 | 72.4 | 44.6 | 26.5 | 57.0 |
| 296 | 62.9 | 27.3 | 43.1 | 32.4 | 59.7 | 52.8 | 57.4 | 69.8 | 91.7 | 61.3 | 70.1 | 77.4 | 69.3 | 48.6 | 44.2 | 66.1 |
| 297 | 68.8 | 39.6 | 46.8 | 38.7 | 77.0 | 61.4 | 75.3 | 66.4 | 97.2 | 60.0 | 57.3 | 64.0 | 66.1 | 44.1 | 33.2 | 67.7 |
| 298 | 67.6 | 29.9 | 36.4 | 26.8 | 58.3 | 75.8 | 79.7 | 60.2 | 98.9 | 77.1 | 69.2 | 76.2 | 79.0 | 45.8 | 37.4 | 57.0 |
| 299 | 57.6 | 37.6 | 31.2 | 38.5 | 82.7 | 51.6 | 58.8 | 73.8 | 86.8 | 58.3 | 54.9 | 73.2 | 62.0 | 46.2 | 43.0 | 64.3 |
| 300 | 70.4 | 41.4 | 26.4 | 37.1 | 76.5 | 61.3 | 58.5 | 79.7 | 96.0 | 64.9 | 73.8 | 66.9 | 65.2 | 29.5 | 29.7 | 69.4 |

peak loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 301 | 55.1 | 40.3 | 36.6 | 29.4 | 56.7 | 60.3 | 58.4 | 75.7 | 94.3 | 79.4 | 60.1 | 67.0 | 75.1 | 44.9 | 42.3 | 51.4 |
| 302 | 66.2 | 45.9 | 32.7 | 29.8 | 66.9 | 82.5 | 84.2 | 53.5 | 80.9 | 66.3 | 75.4 | 62.1 | 72.2 | 42.9 | 48.1 | 57.9 |
| 303 | 56.4 | 42.5 | 39.2 | 31.9 | 66.5 | 63.7 | 68.5 | 52.8 | 93.5 | 52.0 | 72.6 | 73.0 | 50.0 | 35.5 | 41.6 | 71.1 |
| 304 | 61.9 | 27.3 | 45.3 | 31.3 | 54.7 | 77.3 | 57.4 | 60.7 | 99.3 | 51.2 | 68.3 | 68.7 | 78.1 | 41.7 | 38.2 | 78.4 |
| 305 | 60.0 | 28.2 | 38.6 | 47.9 | 60.6 | 84.0 | 63.5 | 61.9 | 95.0 | 56.6 | 56.7 | 50.8 | 55.5 | 33.7 | 48.1 | 72.9 |
| 306 | 69.6 | 39.9 | 38.1 | 39.7 | 50.4 | 65.5 | 77.1 | 69.1 | 96.0 | 62.4 | 50.4 | 79.0 | 58.9 | 44.5 | 34.5 | 59.9 |
| 307 | 68.1 | 33.0 | 40.3 | 30.4 | 79.3 | 51.6 | 74.1 | 83.5 | 94.6 | 55.8 | 67.4 | 50.7 | 52.8 | 31.1 | 29.5 | 79.4 |
| 308 | 61.6 | 36.7 | 34.8 | 42.5 | 65.5 | 67.3 | 79.3 | 56.8 | 92.1 | 57.0 | 68.2 | 68.0 | 79.8 | 41.4 | 29.6 | 77.5 |
| 309 | 74.4 | 48.4 | 28.3 | 34.9 | 81.6 | 58.6 | 63.4 | 75.5 | 90.3 | 61.0 | 66.7 | 60.5 | 62.2 | 37.5 | 43.6 | 65.5 |
| 310 | 69.8 | 45.8 | 40.5 | 27.7 | 84.8 | 51.6 | 66.9 | 79.1 | 84.0 | 68.0 | 60.9 | 68.4 | 77.2 | 28.7 | 29.2 | 54.3 |
| 311 | 59.9 | 49.9 | 37.6 | 39.4 | 55.2 | 67.3 | 77.1 | 66.4 | 104.1 | 77.5 | 54.3 | 64.7 | 80.0 | 27.5 | 27.9 | 55.7 |
| 312 | 61.9 | 38.7 | 45.0 | 44.2 | 56.0 | 75.3 | 78.8 | 51.9 | 91.1 | 56.4 | 64.2 | 81.8 | 63.7 | 49.1 | 31.2 | 73.3 |
| 313 | 54.4 | 25.9 | 26.9 | 44.7 | 80.7 | 78.5 | 67.8 | 51.9 | 95.2 | 73.9 | 63.3 | 63.3 | 74.4 | 40.3 | 30.1 | 64.3 |
| 314 | 78.3 | 30.3 | 49.0 | 28.7 | 64.1 | 68.0 | 62.4 | 56.1 | 89.0 | 54.6 | 75.9 | 71.7 | 64.2 | 43.4 | 49.0 | 58.4 |
| 315 | 77.3 | 32.9 | 45.0 | 26.7 | 57.6 | 74.9 | 68.6 | 59.0 | 91.6 | 56.3 | 68.6 | 61.9 | 62.0 | 32.7 | 48.0 | 64.4 |
| 316 | 82.0 | 44.5 | 29.2 | 29.8 | 67.8 | 78.0 | 84.5 | 68.7 | 90.7 | 78.9 | 57.7 | 85.9 | 63.1 | 45.5 | 45.1 | 75.7 |
| 317 | 77.8 | 46.6 | 29.6 | 32.7 | 53.7 | 63.8 | 79.7 | 52.2 | 86.8 | 60.2 | 73.6 | 78.3 | 78.1 | 49.6 | 48.3 | 61.6 |
| 318 | 79.4 | 34.0 | 46.9 | 41.1 | 74.4 | 56.5 | 64.5 | 75.8 | 96.0 | 77.0 | 62.1 | 60.3 | 52.0 | 46.6 | 42.8 | 50.3 |
| 319 | 75.5 | 33.0 | 36.7 | 31.8 | 54.4 | 58.5 | 71.4 | 63.6 | 89.1 | 73.6 | 71.2 | 67.9 | 51.9 | 29.2 | 32.0 | 65.3 |
| 320 | 77.1 | 26.6 | 33.3 | 43.9 | 61.8 | 82.3 | 68.6 | 82.5 | 104.0 | 57.1 | 72.2 | 67.0 | 74.0 | 36.2 | 32.5 | 55.1 |
| 321 | 58.6 | 37.2 | 29.8 | 27.3 | 63.5 | 76.2 | 54.0 | 63.6 | 84.7 | 71.1 | 73.1 | 53.6 | 77.3 | 28.6 | 48.9 | 55.6 |
| 322 | 71.7 | 32.6 | 31.6 | 34.8 | 78.5 | 71.0 | 65.0 | 60.2 | 82.5 | 64.1 | 50.6 | 61.8 | 69.2 | 28.5 | 48.1 | 73.2 |
| 323 | 60.3 | 42.3 | 26.7 | 46.4 | 80.3 | 65.1 | 80.6 | 73.2 | 98.6 | 62.7 | 60.1 | 73.6 | 63.3 | 34.1 | 40.8 | 75.8 |
| 324 | 64.4 | 45.0 | 38.4 | 40.8 | 81.2 | 77.7 | 79.3 | 73.2 | 83.2 | 69.0 | 70.6 | 67.5 | 60.0 | 44.6 | 38.4 | 56.2 |
| 325 | 79.7 | 33.4 | 49.3 | 40.0 | 51.9 | 65.5 | 82.6 | 68.8 | 94.8 | 79.7 | 51.0 | 67.1 | 56.6 | 44.7 | 33.6 | 62.1 |
| 326 | 73.2 | 49.0 | 25.2 | 43.2 | 69.3 | 60.5 | 68.7 | 59.5 | 83.6 | 79.6 | 78.7 | 58.6 | 78.7 | 29.8 | 42.4 | 79.6 |
| 327 | 58.5 | 42.3 | 40.1 | 49.0 | 52.3 | 71.8 | 76.9 | 56.1 | 85.3 | 70.1 | 68.5 | 57.2 | 62.3 | 41.0 | 45.0 | 54.2 |
| 328 | 54.7 | 49.0 | 40.6 | 48.9 | 74.4 | 51.6 | 51.7 | 51.3 | 93.7 | 75.0 | 54.5 | 75.3 | 67.4 | 41.4 | 39.4 | 71.4 |
| 329 | 64.2 | 37.8 | 45.8 | 28.8 | 76.3 | 64.6 | 73.4 | 50.1 | 84.1 | 73.6 | 58.3 | 73.1 | 74.0 | 35.5 | 45.5 | 59.6 |
| 330 | 63.7 | 49.3 | 49.3 | 30.5 | 83.5 | 72.0 | 63.7 | 67.7 | 99.3 | 59.8 | 57.9 | 56.8 | 53.6 | 36.4 | 27.3 | 67.7 |
| 331 | 52.2 | 42.8 | 48.7 | 27.4 | 75.2 | 66.4 | 76.6 | 60.3 | 91.4 | 72.0 | 55.3 | 57.9 | 60.2 | 48.8 | 36.3 | 66.9 |
| 332 | 50.7 | 36.0 | 41.0 | 31.2 | 84.4 | 64.0 | 80.9 | 55.8 | 93.3 | 62.6 | 70.2 | 66.4 | 62.7 | 34.1 | 44.4 | 71.4 |
| 333 | 54.7 | 46.5 | 49.7 | 42.8 | 55.7 | 56.6 | 76.9 | 54.2 | 94.7 | 79.9 | 70.9 | 56.1 | 69.7 | 30.3 | 25.6 | 56.0 |
| 334 | 53.6 | 48.1 | 32.1 | 31.7 | 80.2 | 82.3 | 57.7 | 69.0 | 100.0 | 57.9 | 61.8 | 67.6 | 74.7 | 44.0 | 44.5 | 73.7 |
| 335 | 66.8 | 29.4 | 48.1 | 41.6 | 65.7 | 80.6 | 67.0 | 76.1 | 86.6 | 64.9 | 60.7 | 60.4 | 62.8 | 32.6 | 34.8 | 60.6 |
| 336 | 51.3 | 41.6 | 35.3 | 38.0 | 72.5 | 64.0 | 68.4 | 83.7 | 99.0 | 64.6 | 76.9 | 63.9 | 68.7 | 49.6 | 26.1 | 57.4 |
| 337 | 56.8 | 43.8 | 43.6 | 45.3 | 82.2 | 81.7 | 84.8 | 68.4 | 88.8 | 72.5 | 56.5 | 78.1 | 68.5 | 47.3 | 30.6 | 78.9 |
| 338 | 50.9 | 39.7 | 28.6 | 44.7 | 82.0 | 75.9 | 84.9 | 73.4 | 88.0 | 50.1 | 71.6 | 59.5 | 65.3 | 48.9 | 49.4 | 51.7 |
| 339 | 59.6 | 28.1 | 35.5 | 25.3 | 67.1 | 62.3 | 65.5 | 62.8 | 95.3 | 66.7 | 52.3 | 52.2 | 52.4 | 33.2 | 30.8 | 62.3 |
| 340 | 77.6 | 40.9 | 38.3 | 47.7 | 70.2 | 50.9 | 80.4 | 72.3 | 90.4 | 72.1 | 63.2 | 52.5 | 79.8 | 30.7 | 34.7 | 52.0 |
| 341 | 56.8 | 28.0 | 42.9 | 33.7 | 56.4 | 54.8 | 79.8 | 68.8 | 88.7 | 56.3 | 74.4 | 63.5 | 55.8 | 26.1 | 49.6 | 67.6 |
| 342 | 63.1 | 25.9 | 28.4 | 38.6 | 83.1 | 54.1 | 64.1 | 82.6 | 93.0 | 60.3 | 72.4 | 77.7 | 78.0 | 27.5 | 49.1 | 53.2 |
| 343 | 69.0 | 30.0 | 25.5 | 35.7 | 80.0 | 80.1 | 54.8 | 50.8 | 97.7 | 67.1 | 56.2 | 79.1 | 74.8 | 31.0 | 46.5 | 58.9 |
| 344 | 64.1 | 34.3 | 46.9 | 32.9 | 59.2 | 51.6 | 82.7 | 58.5 | 98.6 | 63.1 | 72.1 | 72.0 | 63.2 | 37.6 | 39.5 | 58.8 |
| 345 | 57.2 | 44.2 | 38.8 | 39.3 | 68.8 | 79.8 | 61.5 | 60.8 | 87.7 | 71.6 | 53.5 | 50.0 | 55.0 | 38.9 | 38.9 | 67.4 |
| 346 | 50.9 | 37.3 | 39.7 | 39.3 | 76.3 | 72.2 | 81.5 | 61.5 | 85.7 | 66.5 | 53.6 | 75.2 | 54.8 | 41.0 | 40.1 | 64.7 |
| 347 | 51.9 | 48.4 | 43.2 | 43.7 | 83.5 | 55.6 | 72.9 | 58.2 | 94.5 | 60.4 | 71.1 | 63.9 | 54.1 | 25.5 | 29.9 | 69.1 |
| 348 | 76.7 | 48.9 | 47.7 | 35.8 | 55.2 | 66.2 | 56.0 | 58.0 | 99.2 | 55.0 | 56.9 | 61.3 | 69.1 | 35.2 | 49.6 | 67.1 |
| 349 | 61.8 | 31.8 | 48.2 | 26.9 | 52.9 | 70.0 | 70.1 | 58.3 | 88.3 | 61.1 | 55.4 | 73.8 | 57.4 | 28.3 | 29.9 | 75.7 |
| 350 | 72.4 | 41.3 | 38.4 | 33.6 | 53.5 | 62.5 | 50.5 | 76.2 | 86.0 | 58.6 | 55.9 | 52.1 | 57.2 | 37.3 | 28.6 | 51.8 |
| 351 | 58.6 | 42.8 | 39.6 | 33.6 | 58.8 | 76.8 | 65.1 | 79.3 | 92.0 | 72.2 | 72.6 | 56.6 | 70.0 | 28.1 | 43.2 | 57.8 |
| 352 | 70.9 | 31.7 | 27.9 | 31.7 | 69.8 | 72.4 | 79.5 | 56.7 | 89.9 | 78.0 | 71.9 | 52.6 | 66.3 | 31.3 | 36.2 | 57.8 |
| 353 | 63.6 | 30.8 | 49.5 | 40.3 | 74.3 | 80.6 | 66.7 | 79.9 | 84.1 | 79.7 | 66.4 | 69.1 | 53.0 | 39.1 | 43.0 | 68.7 |
| 354 | 51.7 | 39.7 | 43.4 | 31.6 | 54.6 | 60.5 | 64.9 | 76.1 | 83.3 | 61.5 | 78.2 | 59.6 | 66.0 | 39.0 | 35.6 | 72.5 |
| 355 | 79.0 | 46.9 | 45.6 | 26.4 | 63.0 | 82.7 | 70.3 | 82.2 | 89.7 | 57.7 | 68.4 | 64.9 | 61.3 | 43.4 | 47.3 | 72.4 |
| 356 | 65.0 | 41.1 | 46.8 | 46.4 | 63.8 | 63.0 | 52.0 | 67.5 | 94.3 | 65.8 | 70.5 | 67.9 | 78.9 | 38.8 | 25.5 | 53.1 |
| 357 | 75.7 | 45.6 | 38.1 | 30.3 | 80.2 | 83.7 | 74.5 | 80.5 | 86.1 | 77.6 | 50.9 | 79.6 | 71.3 | 34.4 | 36.2 | 60.8 |
| 358 | 51.6 | 30.1 | 33.9 | 30.3 | 66.8 | 72.2 | 67.8 | 71.4 | 98.6 | 66.8 | 51.5 | 54.3 | 77.7 | 39.9 | 36.2 | 79.1 |
| 359 | 73.0 | 29.2 | 48.0 | 29.9 | 68.6 | 82.9 | 74.7 | 83.4 | 88.6 | 71.6 | 78.4 | 55.5 | 55.8 | 36.4 | 41.8 | 60.4 |
| 360 | 52.7 | 30.5 | 44.4 | 28.1 | 64.7 | 83.3 | 50.1 | 80.7 | 86.0 | 71.1 | 56.8 | 54.6 | 70.3 | 38.6 | 32.0 | 79.7 |
| 361 | 76.5 | 46.7 | 44.0 | 26.4 | 54.1 | 84.9 | 63.5 | 74.5 | 88.6 | 60.3 | 73.6 | 57.3 | 58.7 | 44.4 | 45.1 | 66.2 |
| 362 | 77.6 | 44.2 | 46.7 | 25.7 | 80.1 | 55.7 | 78.4 | 68.8 | 88.1 | 63.4 | 75.4 | 69.6 | 72.9 | 31.2 | 38.9 | 69.1 |
| 363 | 65.7 | 34.2 | 49.6 | 47.5 | 83.5 | 62.3 | 83.6 | 76.9 | 99.1 | 59.1 | 61.1 | 76.3 | 61.0 | 36.9 | 34.5 | 78.5 |
| 364 | 51.1 | 36.4 | 47.8 | 26.9 | 55.8 | 51.7 | 72.8 | 79.6 | 80.2 | 68.9 | 56.1 | 57.6 | 68.1 | 43.5 | 38.7 | 75.8 |
| 365 | 76.8 | 46.8 | 49.4 | 48.3 | 71.1 | 57.0 | 66.6 | 82.4 | 93.3 | 65.1 | 72.3 | 74.0 | 63.2 | 32.3 | 48.6 | 57.0 |
| 366 | 77.7 | 35.4 | 35.3 | 28.0 | 53.6 | 69.5 | 80.8 | 59.9 | 95.2 | 79.6 | 61.8 | 68.7 | 69.0 | 38.8 | 45.3 | 57.5 |
| 367 | 64.9 | 25.7 | 38.9 | 25.8 | 51.5 | 82.3 | 74.1 | 77.5 | 83.1 | 77.5 | 73.8 | 68.8 | 74.4 | 29.3 | 34.0 | 68.6 |
| 368 | 62.3 | 49.5 | 49.8 | 41.9 | 75.4 | 58.6 | 55.7 | 77.7 | 96.4 | 72.6 | 67.0 | 61.1 | 59.7 | 31.1 | 25.2 | 50.1 |
| 369 | 65.3 | 44.8 | 48.8 | 42.3 | 58.1 | 52.9 | 84.6 | 72.6 | 80.4 | 68.3 | 63.7 | 79.8 | 58.4 | 36.5 | 35.8 | 54.7 |
| 370 | 57.8 | 27.9 | 32.1 | 38.6 | 70.5 | 82.3 | 54.9 | 54.8 | 89.7 | 66.0 | 78.2 | 53.6 | 64.1 | 37.1 | 33.0 | 52.6 |
| 371 | 75.6 | 33.8 | 38.3 | 39.1 | 76.3 | 78.9 | 57.5 | 66.4 | 89.7 | 66.5 | 54.0 | 53.2 | 54.5 | 31.1 | 30.2 | 75.1 |
| 372 | 50.6 | 34.8 | 26.3 | 46.1 | 80.8 | 68.9 | 57.9 | 73.8 | 86.3 | 55.4 | 68.8 | 65.2 | 62.6 | 49.2 | 36.1 | 50.0 |
| 373 | 53.4 | 25.8 | 47.2 | 46.7 | 53.4 | 69.1 | 56.0 | 84.7 | 97.3 | 57.4 | 53.5 | 60.0 | 79.6 | 48.8 | 45.3 | 58.1 |
| 374 | 73.3 | 47.4 | 30.0 | 32.7 | 51.0 | 52.7 | 69.6 | 73.5 | 85.7 | 68.2 | 52.0 | 79.3 | 70.9 | 39.7 | 28.3 | 63.9 |
| 375 | 69.3 | 45.5 | 26.8 | 32.7 | 80.5 | 61.7 | 67.3 | 67.2 | 81.3 | 68.6 | 60.6 | 58.9 | 51.8 | 25.1 | 29.6 | 78.5 |

peak loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 376 | 56.5 | 38.9 | 43.3 | 36.6 | 67.6 | 58.3 | 81.2 | 78.0 | 88.4 | 78.9 | 53.1 | 68.5 | 70.2 | 37.0 | 48.7 | 69.2 |
| 377 | 69.1 | 46.4 | 29.1 | 33.3 | 63.3 | 53.7 | 84.4 | 54.4 | 94.6 | 77.3 | 64.6 | 53.5 | 68.7 | 32.6 | 48.0 | 76.0 |
| 378 | 76.5 | 29.5 | 25.6 | 25.1 | 75.5 | 50.8 | 72.1 | 74.9 | 83.5 | 57.6 | 68.6 | 51.8 | 66.6 | 45.1 | 33.3 | 75.5 |
| 379 | 50.9 | 35.6 | 32.0 | 36.8 | 56.9 | 65.4 | 64.6 | 61.2 | 89.7 | 68.8 | 76.6 | 69.2 | 72.2 | 40.0 | 47.6 | 65.5 |
| 380 | 66.5 | 35.0 | 45.8 | 31.8 | 56.9 | 59.7 | 50.3 | 81.6 | 96.4 | 79.3 | 55.1 | 51.8 | 63.1 | 44.8 | 26.9 | 68.7 |
| 381 | 51.4 | 35.3 | 28.2 | 34.7 | 78.5 | 79.9 | 81.8 | 59.3 | 92.3 | 51.4 | 74.1 | 78.7 | 78.8 | 35.7 | 40.9 | 56.5 |
| 382 | 61.3 | 29.5 | 40.7 | 39.1 | 54.0 | 54.7 | 51.4 | 54.1 | 88.7 | 58.8 | 65.3 | 65.8 | 73.9 | 48.7 | 47.6 | 76.5 |
| 383 | 59.1 | 35.1 | 27.1 | 46.9 | 75.1 | 69.0 | 59.3 | 63.9 | 83.8 | 73.5 | 74.7 | 55.0 | 62.2 | 26.5 | 36.5 | 66.0 |
| 384 | 51.8 | 36.3 | 40.6 | 29.7 | 72.2 | 63.3 | 79.4 | 84.8 | 81.0 | 57.5 | 65.5 | 60.0 | 79.0 | 29.2 | 43.3 | 74.1 |
| 385 | 74.3 | 29.4 | 30.0 | 37.0 | 65.4 | 61.0 | 82.2 | 64.6 | 81.9 | 52.7 | 78.4 | 56.0 | 68.3 | 36.0 | 38.9 | 73.4 |
| 386 | 50.2 | 27.5 | 36.6 | 32.1 | 57.8 | 56.6 | 61.9 | 79.3 | 90.5 | 75.7 | 75.4 | 75.1 | 73.8 | 25.8 | 27.4 | 59.6 |
| 387 | 72.4 | 29.6 | 26.6 | 44.8 | 76.9 | 66.5 | 72.6 | 83.0 | 98.4 | 66.3 | 52.0 | 73.2 | 56.6 | 27.7 | 26.4 | 60.0 |
| 388 | 55.1 | 46.9 | 46.5 | 38.2 | 78.1 | 65.3 | 57.5 | 62.7 | 94.4 | 61.6 | 65.8 | 65.9 | 76.3 | 27.5 | 48.5 | 62.2 |
| 389 | 71.9 | 37.9 | 42.0 | 40.7 | 73.0 | 70.1 | 77.0 | 54.5 | 92.5 | 54.5 | 53.3 | 50.5 | 71.3 | 42.0 | 26.4 | 51.3 |
| 390 | 63.3 | 25.8 | 48.5 | 48.1 | 82.3 | 64.1 | 54.3 | 75.4 | 81.7 | 76.8 | 67.3 | 78.3 | 57.2 | 35.7 | 47.6 | 72.4 |
| 391 | 78.4 | 33.3 | 41.3 | 27.8 | 76.3 | 51.7 | 52.7 | 82.2 | 85.7 | 61.1 | 57.8 | 74.5 | 60.7 | 38.6 | 35.0 | 76.8 |
| 392 | 59.8 | 34.7 | 36.0 | 46.8 | 73.0 | 60.9 | 67.9 | 67.8 | 82.5 | 54.0 | 75.3 | 70.4 | 69.5 | 49.8 | 32.7 | 52.7 |
| 393 | 58.7 | 31.9 | 42.8 | 36.3 | 63.6 | 64.9 | 67.5 | 60.4 | 86.1 | 65.2 | 55.2 | 76.5 | 52.6 | 26.2 | 29.3 | 69.0 |
| 394 | 59.0 | 46.6 | 35.9 | 48.4 | 58.8 | 56.7 | 52.5 | 81.1 | 94.3 | 76.5 | 59.4 | 61.8 | 61.3 | 32.9 | 44.1 | 61.8 |
| 395 | 79.6 | 29.6 | 39.1 | 38.1 | 77.5 | 76.5 | 71.0 | 66.8 | 84.8 | 70.1 | 69.9 | 53.5 | 71.1 | 41.8 | 41.1 | 72.4 |
| 396 | 71.5 | 35.0 | 45.6 | 46.1 | 81.1 | 63.2 | 62.8 | 68.6 | 90.6 | 53.9 | 78.5 | 63.4 | 75.8 | 27.3 | 47.6 | 51.4 |
| 397 | 77.3 | 26.4 | 26.4 | 29.5 | 70.8 | 75.4 | 76.6 | 75.1 | 86.9 | 66.3 | 67.7 | 76.2 | 60.9 | 25.5 | 37.5 | 63.5 |
| 398 | 70.7 | 42.8 | 48.0 | 48.6 | 66.4 | 64.2 | 51.9 | 77.1 | 89.5 | 61.8 | 57.8 | 72.0 | 78.9 | 41.2 | 45.6 | 67.6 |
| 399 | 65.2 | 38.9 | 39.5 | 39.4 | 81.0 | 71.0 | 73.5 | 76.7 | 82.7 | 59.2 | 77.7 | 58.3 | 66.7 | 42.3 | 41.4 | 59.8 |
| 400 | [illegible] | 41.6 | 47.3 | 32.1 | 73.9 | 81.6 | 61.2 | 71.4 | 93.8 | 59.4 | 70.7 | 76.5 | 57.3 | 38.3 | 36.2 | 62.2 |
| 401 | 51.9 | 40.0 | 30.1 | 33.7 | 64.8 | 71.1 | 65.1 | 69.2 | 89.6 | 54.0 | 57.8 | 78.7 | 50.7 | 46.3 | 30.4 | 76.0 |
| 402 | 63.7 | 39.5 | 47.6 | 38.7 | 73.2 | 83.7 | 76.0 | 77.1 | 82.8 | 73.8 | 71.7 | 54.4 | 73.0 | 48.6 | 44.0 | 68.3 |
| 403 | 70.3 | 40.3 | 43.7 | 45.4 | 52.1 | 81.8 | 78.2 | 51.1 | 90.3 | 75.2 | 79.3 | 69.3 | 68.5 | 37.5 | 34.9 | 75.2 |
| 404 | 64.6 | 26.3 | 25.3 | 31.2 | 52.8 | 51.6 | 84.4 | 52.1 | 84.7 | 67.7 | 66.2 | 51.7 | 70.7 | 34.3 | 41.1 | 65.8 |
| 405 | 63.3 | 26.1 | 44.5 | 49.3 | 54.9 | 62.6 | 71.9 | 69.8 | 87.6 | 78.1 | 51.9 | 67.2 | 58.7 | 39.3 | 48.3 | 65.5 |
| 406 | 76.5 | 48.0 | 44.2 | 26.8 | 54.8 | 61.9 | 83.5 | 63.9 | 96.0 | 53.7 | 64.8 | 60.3 | 54.5 | 31.0 | 49.7 | 61.5 |
| 407 | 76.3 | 43.8 | 46.2 | 41.3 | 84.0 | 54.8 | 53.2 | 68.7 | 98.9 | 56.7 | 66.2 | 51.8 | 51.5 | 32.8 | 28.5 | 70.1 |
| 408 | 77.7 | 44.5 | 35.5 | 35.9 | 79.2 | 62.2 | 63.3 | 73.2 | 88.1 | 57.1 | 64.2 | 53.9 | 73.7 | 47.7 | 30.5 | 69.2 |
| 409 | 78.9 | 38.2 | 29.1 | 42.4 | 79.0 | 84.3 | 82.4 | 84.4 | 84.8 | 60.4 | 64.7 | 78.9 | 51.3 | 47.5 | 37.9 | 69.2 |
| 410 | 57.6 | 30.9 | 29.9 | 39.0 | 78.8 | 70.9 | 58.8 | 50.9 | 88.6 | 57.0 | 54.4 | 75.5 | 74.0 | 48.4 | 46.3 | 58.5 |
| 411 | 57.8 | 45.1 | 39.7 | 34.1 | 79.7 | 84.9 | 74.5 | 81.2 | 81.7 | 52.6 | 66.2 | 66.3 | 60.2 | 37.9 | 32.0 | 71.6 |
| 412 | 59.1 | 33.3 | 43.9 | 25.3 | 67.3 | 67.5 | 80.9 | 73.2 | 88.5 | 64.3 | 60.8 | 68.9 | 60.5 | 32.2 | 34.8 | 51.7 |
| 413 | 57.7 | 37.5 | 26.6 | 28.9 | 59.8 | 58.9 | 54.7 | 80.4 | 89.0 | 52.1 | 78.2 | 50.8 | 60.3 | 31.7 | 49.9 | 55.8 |
| 414 | 54.3 | 28.2 | 27.5 | 47.7 | 61.8 | 54.7 | 50.5 | 65.5 | 92.0 | 67.6 | 54.7 | 72.9 | 62.4 | 49.7 | 41.5 | 75.3 |
| 415 | 50.1 | 39.8 | 25.6 | 38.9 | 50.2 | 62.1 | 84.2 | 55.4 | 88.4 | 78.7 | 75.0 | 59.2 | 56.7 | 38.2 | 37.7 | 73.9 |
| 416 | 51.8 | 45.5 | 39.5 | 31.3 | 50.6 | 57.1 | 67.6 | 69.3 | 98.2 | 72.2 | 62.4 | 63.1 | 50.8 | 27.2 | 37.2 | 53.1 |
| 417 | 58.4 | 39.1 | 34.7 | 45.7 | 50.4 | 82.6 | 69.5 | 51.3 | 90.6 | 57.8 | 68.7 | 61.9 | 68.7 | 34.0 | 41.3 | 62.6 |
| 418 | 75.2 | 45.2 | 49.7 | 31.9 | 58.7 | 64.6 | 60.6 | 57.2 | 94.3 | 57.5 | 72.2 | 71.5 | 70.2 | 36.5 | 28.3 | 53.4 |
| 419 | 74.1 | 25.9 | 25.0 | 46.9 | 82.8 | 81.4 | 75.1 | 68.4 | 88.5 | 64.0 | 54.2 | 60.6 | 61.7 | 37.9 | 32.7 | 62.4 |
| 420 | 71.5 | 33.8 | 38.4 | 26.7 | 62.7 | 60.7 | 79.5 | 55.6 | 81.5 | 54.8 | 62.2 | 61.4 | 54.6 | 48.1 | 26.7 | 77.8 |
| 421 | 61.9 | 33.1 | 25.8 | 40.0 | 68.8 | 54.3 | 51.8 | 84.2 | 95.4 | 58.4 | 58.1 | 69.3 | 63.4 | 40.1 | 38.2 | 73.3 |
| 422 | 61.7 | 48.3 | 38.5 | 27.1 | 64.4 | 52.4 | 79.1 | 57.1 | 85.7 | 50.6 | 55.2 | 61.8 | 66.4 | 33.5 | 32.0 | 71.1 |
| 423 | 66.6 | 39.4 | 33.3 | 31.4 | 71.7 | 75.6 | 54.6 | 56.8 | 87.8 | 50.7 | 73.4 | 59.9 | 50.6 | 31.5 | 42.8 | 51.2 |
| 424 | 77.8 | 34.3 | 42.2 | 49.4 | 52.4 | 55.9 | 76.7 | 80.7 | 99.5 | 70.6 | 68.5 | 66.3 | 61.6 | 42.3 | 29.8 | 58.5 |
| 425 | 68.6 | 27.5 | 32.3 | 49.8 | 82.9 | 52.5 | 53.3 | 61.8 | 81.8 | 57.2 | 67.7 | 51.9 | 57.6 | 44.3 | 43.0 | 73.6 |
| 426 | 73.4 | 45.3 | 38.2 | 26.1 | 55.5 | 75.0 | 78.1 | 61.2 | 82.7 | 59.3 | 64.3 | 56.6 | 53.2 | 36.9 | 33.1 | 63.9 |
| 427 | 69.6 | 26.1 | 26.1 | 29.0 | 83.0 | 61.4 | 74.2 | 78.9 | 90.1 | 71.5 | 65.4 | 59.4 | 69.8 | 40.6 | 34.6 | 70.6 |
| 428 | 70.1 | 29.8 | 45.8 | 38.0 | 81.7 | 74.6 | 83.7 | 54.0 | 91.4 | 59.4 | 70.4 | 52.7 | 68.2 | 45.2 | 32.7 | 52.5 |
| 429 | 78.5 | 40.1 | 27.2 | 38.0 | 75.1 | 78.2 | 56.7 | 74.9 | 87.2 | 57.2 | 72.0 | 73.3 | 56.1 | 36.9 | 40.6 | 76.4 |
| 430 | 50.9 | 40.3 | 42.4 | 45.6 | 78.3 | 57.1 | 83.2 | 73.3 | 95.0 | 54.0 | 66.8 | 50.1 | 61.4 | 46.0 | 25.3 | 78.5 |
| 431 | 67.5 | 46.6 | 38.8 | 41.8 | 82.8 | 55.3 | 59.4 | 57.0 | 86.7 | 66.6 | 71.6 | 53.9 | 73.7 | 36.5 | 28.1 | 64.9 |
| 432 | 56.3 | 33.5 | 35.6 | 40.4 | 78.6 | 84.1 | 55.5 | 51.4 | 86.1 | 54.2 | 56.7 | 68.9 | 57.5 | 46.8 | 30.2 | 73.6 |
| 433 | 69.4 | 48.7 | 33.5 | 26.8 | 63.7 | 54.7 | 71.6 | 57.2 | 90.5 | 60.5 | 69.6 | 58.7 | 57.5 | 25.7 | 26.8 | 66.7 |
| 434 | 60.4 | 44.0 | 26.2 | 25.7 | 80.2 | 82.9 | 52.5 | 60.1 | 97.7 | 71.3 | 59.8 | 66.5 | 62.0 | 49.8 | 27.5 | 60.3 |
| 435 | 56.0 | 48.3 | 39.8 | 46.4 | 50.2 | 74.9 | 50.3 | 59.8 | 81.9 | 55.0 | 65.4 | 64.8 | 52.3 | 46.8 | 32.3 | 72.1 |
| 436 | 73.2 | 29.0 | 48.0 | 49.0 | 63.5 | 69.7 | 73.8 | 59.6 | 86.8 | 70.9 | 55.1 | 50.6 | 72.8 | 36.3 | 49.9 | 75.3 |
| 437 | 52.0 | 45.9 | 46.4 | 47.8 | 52.9 | 80.0 | 83.3 | 80.0 | 94.5 | 57.4 | 52.9 | 58.8 | 69.3 | 30.9 | 25.4 | 55.5 |
| 438 | 62.3 | 36.9 | 48.0 | 48.8 | 68.6 | 61.6 | 72.5 | 83.4 | 89.8 | 74.3 | 64.1 | 59.7 | 56.5 | 34.2 | 29.5 | 58.6 |
| 439 | 59.9 | 32.0 | 48.1 | 47.3 | 72.5 | 67.3 | 69.5 | 61.9 | 82.9 | 61.3 | 67.1 | 66.3 | 54.3 | 43.9 | 31.9 | 78.5 |
| 440 | 67.6 | 44.1 | 41.6 | 27.9 | 56.8 | 53.6 | 55.7 | 63.7 | 93.6 | 57.1 | 66.6 | 68.2 | 51.2 | 37.3 | 41.0 | 56.4 |
| 441 | 52.4 | 39.0 | 45.8 | 34.9 | 51.2 | 73.3 | 62.2 | 55.7 | 96.8 | 57.9 | 67.2 | 71.5 | 53.3 | 47.1 | 47.2 | 79.7 |
| 442 | 72.7 | 47.2 | 43.9 | 37.5 | 67.5 | 74.3 | 66.6 | 57.3 | 80.2 | 63.7 | 63.0 | 62.7 | 55.4 | 37.4 | 41.9 | 58.3 |
| 443 | 66.8 | 33.7 | 47.8 | 43.9 | 55.9 | 69.1 | 67.7 | 62.7 | 92.9 | 63.0 | 50.7 | 70.3 | 52.9 | 32.4 | 36.2 | 66.0 |
| 444 | 69.3 | 40.7 | 27.2 | 43.4 | 64.9 | 73.6 | 73.7 | 71.2 | 98.2 | 68.1 | 57.3 | 58.1 | 56.4 | 45.7 | 33.8 | 50.3 |
| 445 | 58.8 | 34.4 | 32.3 | 46.1 | 70.1 | 59.5 | 67.6 | 81.5 | 98.2 | 52.1 | 58.6 | 54.6 | 53.8 | 28.9 | 40.4 | 70.3 |
| 446 | 69.5 | 25.6 | 49.2 | 40.3 | 81.2 | 51.3 | 59.8 | 63.6 | 90.6 | 68.5 | 70.8 | 65.8 | 51.8 | 34.0 | 31.3 | 51.1 |
| 447 | 68.8 | 36.2 | 32.2 | 27.5 | 56.1 | 52.1 | 52.7 | 60.8 | 93.4 | 56.7 | 56.1 | 53.9 | 71.3 | 27.4 | 28.1 | 53.9 |
| 448 | 59.3 | 41.1 | 28.6 | 33.0 | 80.6 | 73.7 | 56.5 | 62.1 | 82.1 | 70.4 | 55.0 | 74.3 | 73.2 | 38.3 | 42.8 | 75.7 |
| 449 | 56.4 | 25.3 | 48.0 | 42.4 | 82.9 | 65.5 | 81.6 | 69.0 | 88.9 | 63.6 | 55.6 | 69.7 | 61.5 | 48.7 | 29.8 | 70.5 |
| 450 | 65.7 | 36.0 | 37.3 | 28.8 | 74.3 | 60.8 | 70.2 | 53.1 | 80.3 | 72.8 | 54.3 | 53.8 | [illegible] | 32.6 | 48.1 | 66.1 |

peak loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 451 | 58.0 | 42.7 | 46.2 | 35.6 | 57.0 | 81.7 | 62.6 | 58.3 | 96.7 | 55.3 | 67.6 | 70.8 | 58.1 | 37.8 | 49.5 | 50.5 |
| 452 | 63.5 | 29.6 | 41.3 | 42.9 | 74.6 | 81.7 | 55.4 | 84.0 | 92.9 | 52.4 | 72.4 | 62.9 | 60.6 | 36.1 | 32.5 | 75.2 |
| 453 | 65.7 | 42.5 | 25.2 | 40.8 | 73.7 | 59.7 | 80.5 | 63.1 | 85.0 | 54.1 | 57.0 | 55.3 | 62.0 | 41.9 | 36.4 | 52.1 |
| 454 | 68.9 | 25.6 | 35.0 | 43.2 | 58.0 | 50.9 | 59.8 | 74.9 | 95.4 | 74.8 | 57.5 | 74.4 | 56.7 | 25.0 | 47.5 | 60.1 |
| 455 | 73.2 | 27.1 | 42.2 | 40.1 | 51.7 | 53.0 | 50.4 | 60.7 | 87.8 | 65.3 | 74.7 | 52.4 | 57.9 | 45.4 | 34.5 | 68.5 |
| 456 | 66.5 | 29.3 | 38.3 | 46.0 | 67.0 | 63.9 | 67.6 | 67.1 | 88.3 | 73.4 | 54.9 | 51.1 | 63.8 | 32.3 | 36.0 | 68.8 |
| 457 | 76.3 | 27.7 | 44.4 | 49.6 | 84.0 | 73.2 | 53.1 | 61.1 | 80.3 | 64.3 | 59.4 | 53.5 | 71.7 | 49.5 | 35.4 | 51.5 |
| 458 | 75.7 | 38.6 | 46.2 | 42.0 | 82.1 | 55.8 | 82.5 | 54.5 | 88.0 | 72.2 | 64.5 | 74.8 | 68.2 | 36.8 | 36.0 | 66.4 |
| 459 | 70.0 | 39.2 | 41.9 | 28.3 | 63.0 | 68.2 | 56.7 | 71.7 | 92.5 | 71.1 | 51.3 | 72.2 | 58.9 | 43.8 | 39.0 | 68.1 |
| 460 | 54.1 | 43.2 | 26.9 | 29.6 | 83.7 | 57.1 | 65.4 | 52.3 | 85.6 | 53.2 | 52.9 | 65.8 | 72.4 | 34.5 | 43.3 | 76.2 |
| 461 | 59.8 | 30.3 | 46.6 | 47.1 | 83.8 | 82.6 | 59.2 | 53.6 | 90.2 | 51.5 | 52.9 | 60.6 | 59.6 | 25.6 | 32.9 | 63.0 |
| 462 | 62.1 | 43.1 | 39.2 | 32.7 | 50.5 | 63.1 | 66.8 | 84.3 | 85.0 | 50.5 | 59.7 | 70.8 | 61.0 | 28.6 | 36.3 | 66.9 |
| 463 | 54.2 | 29.1 | 43.1 | 48.5 | 63.0 | 57.4 | 63.3 | 82.6 | 97.3 | 71.9 | 60.9 | 61.0 | 74.6 | 29.7 | 44.7 | 60.8 |
| 464 | 63.1 | 35.8 | 40.9 | 46.5 | 73.2 | 55.2 | 72.8 | 64.1 | 91.3 | 73.8 | 71.5 | 61.7 | 59.5 | 26.2 | 47.3 | 54.1 |
| 465 | 78.0 | 29.1 | 38.9 | 26.4 | 54.5 | 60.2 | 52.4 | 69.9 | 84.6 | 74.3 | 53.8 | 61.1 | 61.8 | 49.3 | 43.0 | 76.4 |
| 466 | 63.6 | 40.7 | 40.4 | 40.9 | 73.0 | 53.1 | 74.9 | 50.0 | 96.8 | 58.0 | 54.3 | 74.3 | 53.9 | 47.3 | 45.9 | 51.2 |
| 467 | 62.1 | 32.3 | 42.9 | 39.1 | 66.4 | 81.5 | 68.2 | 72.1 | 89.7 | 72.9 | 61.9 | 63.7 | 63.5 | 38.4 | 39.3 | 54.2 |
| 468 | 54.2 | 42.1 | 39.5 | 45.3 | 73.2 | 62.1 | 72.1 | 54.1 | 99.8 | 52.4 | 70.5 | 72.5 | 70.0 | 28.4 | 38.1 | 56.5 |
| 469 | 55.9 | 36.8 | 31.4 | 31.9 | 60.9 | 83.2 | 74.0 | 68.2 | 87.3 | 70.2 | 70.0 | 59.1 | 68.2 | 45.9 | 47.5 | 75.6 |
| 470 | 62.6 | 41.8 | 43.2 | 25.1 | 63.6 | 50.1 | 55.0 | 74.7 | 82.1 | 71.3 | 71.0 | 63.8 | 63.1 | 27.4 | 49.0 | 59.0 |
| 471 | 65.1 | 26.5 | 39.1 | 26.0 | 59.5 | 52.3 | 57.7 | 63.0 | 96.9 | 65.9 | 62.5 | 67.3 | 57.2 | 45.2 | 37.5 | 62.5 |
| 472 | 71.6 | 45.7 | 40.0 | 38.8 | 68.9 | 61.2 | 53.6 | 52.9 | 91.6 | 52.4 | 65.4 | 60.0 | 68.2 | 33.3 | 26.4 | 65.9 |
| 473 | 65.1 | 39.2 | 47.9 | 49.5 | 59.7 | 82.9 | 67.9 | 83.5 | 92.1 | 65.0 | 57.9 | 52.5 | 64.8 | 41.9 | 30.8 | 63.1 |
| 474 | 66.6 | 39.3 | 44.6 | 43.9 | 67.5 | 83.5 | 61.3 | 73.2 | 82.6 | 50.8 | 51.6 | 68.0 | 56.6 | 41.1 | 30.6 | 70.2 |
| 475 | 78.0 | 34.2 | 34.0 | 27.2 | 67.0 | 55.4 | 81.8 | 71.6 | 86.4 | 69.0 | 55.7 | 59.5 | 53.4 | 36.7 | 35.0 | 60.3 |
| 476 | 74.0 | 25.8 | 47.5 | 44.1 | 66.4 | 63.8 | 70.3 | 56.3 | 80.1 | 67.8 | 58.7 | 62.7 | 51.8 | 45.3 | 44.1 | 63.0 |
| 477 | 72.6 | 42.8 | 40.8 | 49.0 | 59.4 | 81.8 | 58.5 | 65.3 | 87.2 | 62.6 | 51.5 | 51.4 | 73.4 | 35.0 | 42.4 | 61.2 |
| 478 | 53.6 | 27.9 | 27.0 | 41.5 | 74.8 | 59.8 | 66.7 | 59.6 | 96.1 | 74.3 | 66.4 | 64.7 | 72.6 | 48.0 | 35.6 | 60.0 |
| 479 | 61.1 | 26.4 | 48.5 | 46.3 | 83.0 | 70.0 | 81.0 | 56.8 | 99.5 | 66.0 | 53.3 | 69.9 | 58.6 | 38.9 | 44.2 | 58.4 |
| 480 | 75.1 | 49.0 | 42.4 | 47.5 | 83.6 | 55.1 | 53.3 | 68.7 | 80.8 | 66.8 | 56.0 | 68.6 | 61.7 | 44.6 | 26.6 | 77.2 |
| 481 | 77.3 | 47.5 | 30.6 | 42.9 | 60.1 | 68.4 | 83.4 | 51.7 | 82.5 | 67.4 | 74.7 | 65.5 | 62.9 | 43.2 | 35.0 | 59.4 |
| 482 | 71.1 | 32.0 | 28.7 | 39.1 | 54.0 | 58.3 | 80.4 | 68.2 | 96.0 | 52.2 | 55.3 | 65.5 | 58.2 | 46.2 | 30.9 | 67.0 |
| 483 | 76.2 | 32.1 | 45.3 | 29.6 | 52.5 | 81.7 | 66.5 | 65.9 | 97.6 | 50.9 | 51.0 | 56.0 | 50.4 | 40.7 | 32.9 | 69.7 |
| 484 | 74.0 | 47.8 | 42.4 | 31.3 | 64.5 | 83.2 | 59.0 | 52.5 | 89.1 | 65.7 | 59.8 | 55.0 | 74.8 | 38.6 | 39.1 | 60.8 |
| 485 | 64.3 | 25.5 | 47.7 | 38.1 | 72.8 | 60.9 | 80.2 | 61.6 | 83.8 | 59.8 | 50.6 | 71.9 | 54.4 | 41.8 | 47.5 | 60.0 |
| 486 | 67.7 | 44.0 | 45.9 | 40.0 | 63.0 | 51.5 | 53.9 | 69.9 | 98.3 | 50.4 | 51.6 | 68.7 | 51.9 | 41.6 | 41.4 | 70.8 |
| 487 | 57.5 | 28.3 | 45.6 | 39.2 | 66.1 | 84.8 | 65.9 | 82.1 | 97.8 | 57.5 | 54.1 | 70.9 | 54.6 | 37.4 | 49.7 | 63.0 |
| 488 | 72.3 | 41.8 | 36.5 | 49.2 | 84.6 | 50.6 | 80.2 | 68.0 | 84.1 | 51.8 | 58.1 | 68.6 | 51.2 | 32.6 | 39.3 | 73.1 |
| 489 | 51.6 | 30.3 | 38.7 | 41.5 | 68.2 | 65.8 | 82.5 | 65.2 | 87.2 | 60.0 | 63.2 | 64.7 | 74.8 | 48.8 | 43.9 | 59.9 |
| 490 | 60.2 | 28.4 | 31.7 | 33.9 | 56.6 | 52.0 | 81.9 | 65.4 | 86.5 | 67.7 | 61.7 | 55.6 | 55.2 | 34.4 | 34.2 | 61.7 |
| 491 | 51.6 | 46.4 | 41.1 | 43.2 | 52.7 | 67.2 | 59.1 | 61.2 | 87.7 | 55.8 | 50.3 | 67.5 | 74.2 | 47.0 | 32.7 | 59.8 |
| 492 | 67.1 | 29.1 | 37.0 | 30.2 | 63.4 | 55.7 | 58.1 | 82.7 | 81.7 | 74.9 | 57.1 | 59.9 | 59.1 | 33.9 | 47.9 | 52.3 |
| 493 | 70.8 | 49.8 | 40.8 | 39.0 | 53.4 | 73.8 | 50.0 | 61.7 | 88.4 | 60.6 | 51.8 | 66.9 | 63.4 | 36.5 | 37.4 | 51.4 |
| 494 | 61.2 | 25.4 | 47.8 | 26.7 | 83.3 | 62.8 | 53.6 | 70.5 | 96.5 | 56.7 | 56.3 | 59.0 | 88.2 | 33.9 | 34.2 | 71.4 |
| 495 | 61.6 | 41.6 | 46.9 | 35.5 | 70.4 | 83.2 | 65.7 | 73.8 | 96.2 | 55.6 | 71.7 | 67.4 | 64.0 | 41.9 | 27.4 | 66.2 |
| 496 | 72.2 | 37.1 | 28.0 | 27.4 | 57.7 | 66.0 | 53.1 | 69.5 | 88.9 | 51.3 | 52.6 | 53.5 | 63.1 | 39.1 | 44.4 | 73.1 |
| 497 | 53.3 | 36.5 | 44.0 | 32.9 | 64.1 | 81.3 | 81.2 | 50.7 | 86.0 | 68.3 | 67.8 | 51.4 | 70.9 | 34.3 | 26.3 | 70.1 |
| 498 | 65.2 | 39.9 | 36.0 | 33.7 | 52.5 | 58.6 | 51.4 | 61.2 | 99.4 | 71.0 | 63.6 | 69.6 | 71.5 | 25.4 | 44.8 | 62.2 |
| 499 | 62.0 | 35.3 | 35.5 | 35.5 | 57.9 | 62.2 | 67.9 | 58.6 | 95.6 | 70.1 | 58.1 | 68.3 | 68.7 | 48.3 | 33.5 | 78.1 |
| 500 | 79.8 | 25.5 | 44.0 | 34.1 | 56.2 | 70.7 | 55.6 | 69.1 | 85.1 | 74.9 | 71.7 | 74.0 | 66.2 | 25.0 | 39.5 | 77.3 |
| 501 | 69.8 | 39.9 | 39.8 | 48.0 | 52.4 | 72.1 | 72.7 | 73.5 | 89.2 | 54.7 | 67.8 | 50.1 | 53.9 | 28.9 | 47.4 | 52.9 |
| 502 | 62.9 | 40.5 | 44.4 | 43.0 | 65.2 | 72.0 | 64.8 | 55.5 | 81.9 | 66.7 | 64.3 | 56.0 | 70.8 | 42.5 | 50.0 | 65.0 |
| 503 | 66.2 | 46.5 | 40.0 | 44.8 | 71.1 | 52.1 | 57.8 | 51.5 | 88.8 | 66.6 | 65.9 | 67.2 | 61.3 | 25.5 | 38.1 | 79.8 |
| 504 | 60.5 | 31.3 | 49.7 | 46.0 | 84.5 | 74.4 | 73.4 | 61.3 | 93.8 | 63.3 | 50.5 | 52.8 | 68.6 | 26.4 | 30.1 | 76.2 |
| 505 | 73.9 | 40.6 | 38.3 | 35.5 | 55.4 | 71.6 | 57.9 | 83.4 | 84.8 | 70.6 | 68.5 | 66.1 | 58.1 | 25.5 | 36.5 | 71.7 |
| 506 | 60.5 | 31.4 | 33.5 | 28.3 | 61.2 | 67.0 | 61.6 | 84.3 | 86.1 | 53.5 | 73.5 | 70.6 | 71.5 | 38.3 | 40.6 | 58.6 |
| 507 | 57.5 | 33.3 | 42.4 | 46.7 | 55.3 | 68.1 | 66.4 | 55.3 | 97.7 | 67.1 | 67.3 | 54.1 | 58.6 | 26.6 | 38.0 | 75.7 |
| 508 | 67.6 | 36.5 | 41.0 | 44.6 | 69.4 | 68.9 | 56.2 | 73.7 | 83.8 | 62.0 | 55.5 | 50.7 | 61.9 | 36.2 | 43.2 | 64.4 |
| 509 | 72.7 | 35.2 | 38.9 | 47.4 | 55.2 | 73.1 | 60.1 | 51.4 | 90.6 | 69.6 | 75.0 | 63.8 | 63.5 | 37.8 | 34.0 | 64.0 |
| 510 | 62.6 | 25.6 | 39.6 | 37.4 | 60.6 | 68.1 | 73.3 | 58.0 | 99.2 | 73.1 | 65.9 | 66.8 | 64.8 | 40.5 | 46.0 | 62.3 |
| 511 | 57.7 | 31.4 | 27.1 | 26.0 | 63.2 | 52.5 | 68.4 | 69.4 | 83.5 | 72.6 | 65.9 | 68.7 | 71.7 | 41.3 | 34.2 | 74.9 |
| 512 | 50.1 | 38.2 | 43.2 | 40.8 | 64.1 | 84.0 | 64.6 | 52.8 | 83.8 | 51.4 | 55.3 | 72.7 | 71.5 | 47.1 | 26.7 | 62.4 |
| 513 | 76.4 | 49.4 | 27.7 | 38.2 | 50.6 | 82.0 | 69.4 | 54.4 | 97.6 | 74.6 | 74.2 | 54.1 | 75.0 | 49.4 | 32.0 | 62.8 |
| 514 | 63.1 | 34.7 | 37.9 | 45.5 | 58.0 | 68.0 | 63.9 | 61.1 | 87.0 | 59.5 | 66.0 | 62.7 | 67.4 | 35.3 | 40.3 | 59.0 |
| 515 | 65.1 | 49.4 | 31.2 | 48.4 | 59.1 | 61.4 | 68.0 | 80.1 | 90.3 | 51.6 | 64.9 | 50.9 | 53.0 | 26.2 | 29.5 | 78.3 |
| 516 | 50.9 | 42.7 | 49.9 | 37.7 | 81.8 | 73.3 | 57.9 | 57.4 | 93.4 | 72.9 | 74.8 | 52.3 | 58.3 | 28.5 | 48.5 | 58.6 |
| 517 | 73.2 | 25.0 | 29.9 | 35.2 | 66.2 | 58.9 | 81.2 | 50.1 | 96.1 | 53.0 | 61.5 | 66.6 | 59.7 | 46.1 | 42.5 | 74.5 |
| 518 | 71.8 | 46.2 | 31.8 | 26.8 | 80.3 | 57.2 | 61.6 | 68.1 | 80.4 | 67.8 | 56.7 | 72.4 | 51.9 | 35.8 | 38.7 | 79.2 |
| 519 | 62.3 | 28.3 | 28.5 | 48.3 | 55.4 | 83.5 | 52.8 | 57.9 | 92.6 | 54.7 | 71.6 | 68.3 | 70.4 | 40.7 | 27.8 | 78.0 |
| 520 | 73.5 | 25.0 | 48.8 | 33.5 | 57.1 | 65.2 | 53.6 | 63.8 | 98.1 | 69.7 | 74.1 | 60.0 | 51.8 | 41.2 | 43.7 | 57.4 |
| 521 | 76.0 | 41.7 | 36.9 | 29.4 | 56.4 | 66.6 | 62.4 | 56.4 | 90.5 | 55.8 | 57.5 | 61.7 | 72.7 | 33.3 | 40.2 | 67.5 |
| 522 | 50.9 | 37.9 | 45.0 | 28.3 | 69.2 | 51.0 | 54.5 | 55.6 | 95.6 | 67.4 | 66.8 | 57.9 | 60.1 | 49.6 | 35.7 | 50.5 |
| 523 | 56.4 | 43.8 | 40.4 | 48.3 | 66.0 | 63.5 | 60.6 | 67.9 | 86.8 | 59.0 | 58.5 | 64.7 | 66.0 | 27.1 | 35.6 | 74.4 |
| 524 | 58.3 | 49.2 | 25.3 | 49.5 | 69.5 | 64.4 | 53.5 | 55.2 | 83.6 | 60.2 | 61.7 | 65.9 | 70.8 | 48.8 | 35.5 | 66.5 |
| 525 | 53.7 | 47.5 | 32.4 | 48.3 | 68.7 | 62.6 | 66.6 | 65.9 | 88.1 | 63.7 | 56.4 | 52.3 | 67.3 | 44.1 | 47.1 | 61.2 |

peak loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 526 | 64.3 | 40.0 | 34.4 | 45.4 | 74.2 | 59.2 | 60.1 | 53.6 | 87.2 | 71.8 | 73.9 | 59.8 | 62.5 | 45.3 | 37.7 | 66.0 |
| 527 | 55.9 | 36.4 | 29.8 | 46.4 | 61.3 | 74.8 | 72.2 | 68.6 | 93.9 | 62.9 | 72.6 | 64.1 | 68.6 | 32.1 | 47.7 | 50.5 |
| 528 | 65.3 | 34.7 | 27.7 | 38.6 | 55.2 | 52.3 | 54.4 | 59.3 | 92.0 | 56.2 | 66.5 | 72.3 | 51.8 | 32.1 | 28.5 | 59.7 |
| 529 | 71.6 | 32.7 | 38.2 | 30.2 | 64.8 | 57.5 | 54.4 | 73.1 | 86.9 | 68.4 | 52.6 | 65.1 | 74.2 | 31.6 | 25.8 | 69.6 |
| 530 | 60.3 | 41.1 | 26.6 | 29.7 | 64.9 | 71.0 | 63.8 | 55.0 | 91.0 | 66.8 | 56.0 | 67.8 | 62.8 | 40.0 | 40.6 | 73.9 |
| 531 | 77.9 | 33.4 | 26.2 | 46.3 | 55.9 | 73.3 | 70.8 | 56.4 | 90.5 | 56.3 | 73.4 | 67.2 | 73.8 | 26.9 | 30.2 | 53.7 |
| 532 | 70.3 | 31.1 | 35.0 | 29.8 | 59.4 | 69.4 | 63.5 | 73.8 | 85.2 | 58.3 | 57.7 | 50.1 | 57.3 | 30.1 | 44.6 | 57.4 |
| 533 | 72.3 | 49.7 | 46.3 | 43.6 | 52.8 | 56.1 | 68.9 | 62.3 | 97.5 | 72.5 | 57.3 | 59.4 | 51.9 | 45.2 | 47.6 | 55.5 |
| 534 | 63.2 | 26.9 | 37.0 | 44.6 | 71.8 | 53.5 | 55.8 | 62.5 | 90.7 | 58.2 | 62.6 | 62.6 | 60.7 | 41.1 | 31.3 | 50.4 |
| 535 | 53.3 | 31.8 | 28.2 | 42.8 | 69.0 | 51.2 | 71.7 | 58.4 | 81.9 | 57.1 | 73.1 | 55.7 | 68.8 | 39.9 | 26.8 | 55.0 |
| 536 | 66.1 | 47.0 | 43.2 | 49.8 | 74.0 | 51.8 | 65.3 | 59.1 | 87.9 | 51.1 | 53.2 | 74.6 | 68.6 | 35.7 | 27.5 | 50.2 |
| 537 | 56.6 | 26.6 | 31.2 | 46.3 | 67.0 | 65.2 | 69.8 | 57.0 | 98.2 | 61.4 | 50.1 | 74.5 | 70.8 | 41.1 | 42.7 | 70.3 |
| 538 | 67.6 | 27.3 | 40.8 | 44.5 | 74.9 | 60.6 | 50.2 | 70.8 | 88.4 | 71.0 | 55.0 | 72.0 | 74.1 | 49.5 | 28.2 | 58.8 |
| 539 | 63.3 | 33.6 | 39.1 | 48.8 | 74.0 | 53.4 | 58.3 | 68.7 | 86.4 | 57.5 | 69.5 | 51.0 | 56.3 | 43.3 | 32.2 | 56.7 |
| 540 | 67.2 | 42.4 | 36.4 | 39.3 | 51.0 | 60.4 | 71.2 | 70.7 | 80.9 | 50.6 | 68.3 | 59.9 | 68.9 | 27.0 | 36.6 | 67.1 |
| 541 | 55.4 | 48.0 | 40.8 | 28.4 | 60.2 | 70.6 | 72.2 | 73.8 | 82.4 | 63.5 | 63.7 | 51.9 | 55.7 | 38.1 | 46.5 | 75.4 |
| 542 | 78.4 | 38.2 | 30.3 | 37.3 | 53.3 | 65.5 | 68.6 | 68.4 | 92.3 | 74.5 | 70.0 | 61.7 | 59.8 | 45.2 | 28.0 | 54.5 |
| 543 | 77.8 | 46.5 | 29.5 | 44.4 | 58.1 | 56.3 | 55.2 | 56.5 | 88.1 | 73.2 | 73.3 | 50.8 | 52.1 | 44.1 | 28.8 | 71.7 |
| 544 | 78.8 | 25.6 | 48.9 | 34.9 | 50.8 | 69.0 | 54.6 | 62.4 | 88.8 | 53.5 | 61.3 | 60.0 | 59.9 | 28.9 | 43.7 | 52.3 |
| 545 | 65.6 | 37.5 | 50.0 | 26.8 | 51.0 | 61.3 | 70.6 | 53.6 | 86.0 | 50.3 | 62.5 | 55.2 | 56.2 | 26.6 | 35.4 | 74.7 |
| 546 | 68.6 | 49.8 | 40.0 | 40.0 | 74.7 | 63.2 | 56.8 | 51.5 | 80.4 | 71.2 | 55.4 | 63.4 | 70.0 | 48.0 | 33.3 | 75.4 |
| 547 | 52.0 | 29.3 | 31.9 | 49.2 | 74.0 | 54.3 | 60.8 | 58.3 | 91.6 | 73.2 | 71.5 | 69.8 | 72.7 | 37.9 | 41.2 | 76.0 |
| 548 | 78.3 | 46.9 | 28.6 | 32.5 | 52.5 | 63.7 | 68.5 | 63.6 | 89.8 | 53.6 | 52.8 | 54.5 | 50.6 | 44.2 | 31.1 | 60.3 |
| 549 | 72.5 | 40.8 | 48.6 | 30.7 | 64.2 | 66.4 | 71.0 | 67.6 | 86.5 | 51.1 | 64.2 | 60.5 | 58.7 | 49.6 | 39.4 | 76.9 |
| 550 | 57.9 | 37.5 | 32.2 | 44.8 | 74.0 | 66.8 | 73.2 | 65.6 | 81.7 | 52.9 | 54.0 | 56.6 | 59.9 | 47.0 | 33.9 | 55.2 |
| 551 | 78.7 | 30.5 | 30.3 | 45.9 | 74.5 | 70.0 | 55.9 | 72.7 | 84.1 | 65.3 | 74.4 | 64.9 | 65.8 | 30.5 | 46.0 | 71.2 |
| 552 | 56.7 | 33.8 | 40.5 | 25.3 | 60.9 | 53.6 | 58.5 | 73.5 | 84.8 | 59.2 | 54.7 | 70.7 | 68.0 | 34.4 | 34.4 | 74.0 |
| 553 | 58.7 | 38.7 | 28.6 | 32.7 | 60.7 | 65.3 | 70.9 | 52.7 | 87.1 | 57.3 | 59.3 | 73.5 | 68.8 | 49.1 | 46.5 | 54.5 |
| 554 | 76.5 | 48.6 | 34.6 | 44.6 | 68.8 | 62.5 | 66.8 | 64.4 | 92.5 | 70.4 | 67.1 | 50.6 | 74.5 | 42.7 | 41.1 | 70.9 |
| 555 | 62.0 | 45.0 | 36.1 | 25.9 | 65.3 | 56.3 | 53.6 | 54.0 | 83.8 | 70.6 | 57.5 | 71.0 | 64.2 | 43.9 | 28.9 | 70.5 |
| 556 | 79.6 | 40.3 | 36.7 | 34.5 | 75.0 | 61.6 | 59.5 | 70.3 | 81.6 | 67.6 | 68.3 | 55.9 | 71.7 | 25.7 | 34.0 | 72.3 |
| 557 | 79.1 | 47.5 | 29.6 | 48.8 | 60.9 | 73.3 | 72.0 | 71.9 | 85.1 | 66.3 | 63.5 | 57.8 | 65.3 | 48.3 | 32.9 | 50.6 |
| 558 | 67.0 | 31.1 | 38.5 | 47.8 | 52.1 | 65.0 | 56.2 | 56.4 | 86.3 | 74.3 | 62.4 | 64.6 | 64.7 | 43.4 | 40.1 | 56.3 |
| 559 | 65.5 | 35.6 | 41.5 | 48.8 | 73.7 | 65.1 | 70.4 | 61.9 | 90.4 | 73.0 | 68.1 | 74.0 | 64.1 | 28.7 | 47.8 | 65.4 |
| 560 | 55.2 | 37.8 | 38.2 | 46.9 | 71.0 | 58.7 | 63.3 | 74.3 | 92.4 | 51.1 | 56.3 | 70.4 | 60.9 | 39.2 | 27.7 | 63.1 |
| 561 | 61.0 | 30.8 | 43.8 | 32.5 | 58.4 | 52.1 | 70.2 | 69.9 | 86.2 | 73.6 | 57.3 | 52.1 | 54.1 | 29.0 | 49.2 | 63.3 |
| 562 | 58.0 | 44.2 | 27.1 | 32.2 | 66.5 | 66.3 | 60.4 | 68.3 | 81.8 | 64.7 | 71.9 | 50.3 | 53.5 | 25.2 | 26.3 | 59.6 |
| 563 | 54.4 | 33.5 | 44.0 | 34.4 | 52.2 | 63.9 | 51.2 | 71.4 | 91.7 | 66.6 | 69.6 | 56.1 | 70.6 | 34.0 | 31.9 | 76.4 |
| 564 | 78.2 | 47.3 | 40.0 | 45.3 | 53.1 | 71.1 | 65.3 | 54.5 | 80.7 | 55.9 | 73.2 | 54.1 | 74.5 | 48.6 | 41.6 | 60.8 |
| 565 | 52.2 | 27.4 | 33.4 | 47.2 | 58.3 | 68.8 | 74.9 | 72.5 | 90.7 | 57.4 | 58.8 | 63.2 | 59.9 | 47.9 | 38.1 | 54.1 |
| 566 | 64.6 | 46.4 | 49.5 | 37.5 | 51.6 | 62.0 | 62.6 | 71.4 | 85.3 | 50.5 | 67.6 | 66.5 | 59.5 | 37.5 | 33.7 | 76.3 |
| 567 | 67.2 | 34.3 | 42.3 | 27.5 | 58.1 | 72.7 | 65.3 | 71.9 | 88.8 | 61.3 | 66.8 | 58.9 | 56.9 | 34.6 | 34.0 | 75.6 |
| 568 | 65.1 | 31.5 | 25.0 | 49.8 | 71.5 | 62.0 | 58.4 | 56.9 | 85.2 | 74.1 | 58.2 | 73.3 | 59.5 | 29.8 | 46.9 | 55.7 |
| 569 | 66.3 | 39.6 | 30.3 | 48.6 | 51.2 | 63.2 | 52.4 | 66.7 | 82.1 | 73.7 | 52.2 | 58.6 | 52.0 | 32.1 | 36.7 | 68.5 |
| 570 | 59.6 | 40.9 | 35.9 | 40.4 | 73.0 | 63.2 | 67.3 | 52.2 | 87.9 | 67.1 | 50.7 | 69.0 | 56.4 | 48.5 | 49.2 | 55.2 |
| 571 | 57.3 | 36.1 | 35.0 | 30.9 | 62.5 | 57.5 | 51.8 | 62.4 | 86.4 | 69.5 | 71.3 | 71.9 | 53.6 | 48.5 | 27.9 | 52.4 |
| 572 | 61.1 | 29.1 | 26.0 | 26.3 | 72.5 | 57.4 | 60.0 | 68.7 | 81.8 | 59.1 | 62.0 | 54.0 | 58.6 | 36.4 | 47.2 | 51.6 |
| 573 | 73.1 | 48.1 | 46.4 | 40.3 | 54.6 | 65.2 | 50.3 | 59.0 | 92.0 | 55.0 | 66.1 | 57.6 | 61.3 | 48.0 | 36.4 | 72.6 |
| 574 | 59.1 | 32.3 | 32.9 | 31.8 | 63.2 | 67.2 | 65.8 | 51.3 | 93.4 | 59.8 | 58.5 | 51.7 | 60.7 | 49.9 | 37.7 | 79.8 |
| 575 | 61.4 | 32.5 | 36.3 | 35.8 | 52.1 | 72.0 | 52.4 | 61.8 | 90.5 | 61.3 | 62.2 | 50.4 | 56.2 | 44.9 | 33.1 | 62.6 |
| 576 | 72.8 | 39.7 | 33.2 | 31.3 | 56.4 | 68.6 | 67.8 | 53.8 | 93.3 | 66.4 | 70.7 | 51.5 | 61.3 | 45.2 | 28.2 | 50.4 |
| 577 | 78.4 | 31.3 | 28.8 | 29.8 | 59.1 | 60.6 | 68.3 | 59.4 | 93.9 | 72.7 | 69.4 | 72.2 | 75.0 | 45.8 | 29.4 | 71.8 |
| 578 | 62.6 | 46.4 | 34.5 | 28.1 | 54.1 | 52.4 | 61.0 | 72.1 | 91.7 | 66.9 | 69.1 | 70.3 | 74.1 | 37.9 | 41.3 | 71.1 |
| 579 | 71.0 | 27.6 | 26.7 | 31.7 | 73.6 | 57.5 | 72.3 | 73.7 | 83.7 | 60.7 | 56.4 | 67.3 | 57.6 | 40.1 | 40.3 | 78.9 |
| 580 | 51.6 | 37.1 | 48.3 | 42.3 | 73.2 | 73.3 | 73.0 | 65.1 | 90.3 | 65.6 | 62.6 | 53.1 | 73.1 | 28.2 | 47.2 | 72.5 |
| 581 | 55.8 | 28.7 | 35.7 | 30.0 | 51.0 | 63.8 | 62.4 | 68.8 | 82.6 | 69.6 | 60.6 | 50.2 | 65.2 | 38.3 | 39.3 | 66.1 |
| 582 | 76.9 | 45.4 | 33.2 | 35.4 | 70.8 | 54.0 | 64.3 | 61.3 | 91.8 | 64.8 | 73.9 | 72.4 | 59.2 | 36.8 | 31.4 | 69.7 |
| 583 | 64.9 | 37.7 | 34.3 | 47.7 | 71.1 | 60.0 | 69.9 | 74.6 | 87.1 | 60.5 | 66.1 | 51.2 | 54.0 | 31.8 | 28.8 | 78.2 |
| 584 | 54.7 | 49.0 | 30.9 | 43.4 | 54.5 | 61.4 | 74.3 | 56.0 | 88.4 | 71.4 | 62.9 | 68.0 | 66.9 | 31.7 | 35.6 | 51.7 |
| 585 | 76.9 | 30.5 | 26.2 | 45.0 | 67.6 | 54.0 | 70.9 | 55.0 | 80.3 | 58.2 | 64.3 | 60.7 | 57.8 | 33.5 | 28.2 | 57.6 |
| 586 | 52.5 | 34.2 | 46.8 | 30.4 | 70.7 | 73.6 | 52.5 | 65.5 | 85.2 | 62.5 | 52.0 | 68.9 | 58.7 | 46.6 | 47.0 | 56.2 |
| 587 | 73.9 | 29.0 | 49.6 | 35.8 | 61.9 | 60.6 | 59.3 | 57.3 | 80.7 | 70.4 | 58.0 | 74.1 | 53.6 | 38.2 | 35.9 | 64.4 |
| 588 | 73.2 | 30.6 | 36.7 | 33.0 | 62.9 | 68.0 | 67.9 | 70.0 | 85.1 | 51.0 | 66.0 | 65.4 | 66.6 | 33.8 | 45.4 | 57.1 |
| 589 | 73.6 | 36.5 | 25.0 | 39.0 | 52.7 | 50.7 | 58.7 | 74.2 | 85.0 | 69.9 | 64.4 | 74.8 | 72.8 | 30.6 | 44.0 | 53.0 |
| 590 | 52.2 | 34.0 | 48.4 | 32.2 | 50.7 | 73.6 | 74.0 | 50.8 | 81.3 | 53.0 | 71.4 | 62.6 | 71.7 | 26.6 | 39.7 | 52.8 |
| 591 | 71.5 | 32.2 | 35.2 | 38.0 | 71.9 | 69.9 | 55.9 | 72.6 | 85.0 | 62.9 | 53.5 | 64.5 | 59.0 | 34.6 | 38.9 | 52.1 |
| 592 | 59.1 | 46.9 | 43.6 | 29.5 | 73.3 | 51.5 | 64.7 | 59.0 | 90.4 | 70.2 | 53.9 | 59.4 | 74.7 | 47.9 | 46.3 | 66.1 |
| 593 | 73.5 | 43.5 | 39.0 | 48.7 | 68.1 | 63.6 | 73.7 | 62.8 | 94.6 | 55.1 | 61.8 | 72.7 | 51.8 | 47.9 | 33.8 | 61.0 |
| 594 | 58.1 | 25.2 | 43.1 | 39.2 | 59.7 | 60.0 | 73.5 | 65.0 | 82.9 | 54.5 | 67.9 | 68.5 | 70.0 | 45.0 | 47.5 | 70.2 |
| 595 | 71.9 | 41.5 | 43.7 | 38.5 | 72.9 | 53.2 | 50.4 | 58.1 | 93.9 | 52.9 | 63.6 | 74.7 | 62.0 | 30.4 | 36.7 | 67.8 |
| 596 | 75.1 | 48.8 | 40.7 | 42.9 | 58.3 | 69.3 | 67.2 | 68.6 | 89.8 | 66.4 | 50.5 | 74.8 | 71.9 | 47.3 | 35.7 | 72.4 |
| 597 | 63.0 | 39.6 | 40.0 | 37.0 | 71.4 | 52.3 | 65.1 | 64.2 | 87.0 | 68.2 | 69.7 | 59.9 | 70.5 | 42.1 | 30.7 | 63.7 |
| 598 | 64.4 | 29.5 | 38.1 | 36.4 | 63.1 | 74.4 | 74.8 | 59.2 | 84.1 | 70.7 | 54.9 | 54.7 | 59.0 | 29.4 | 25.8 | 59.4 |
| 599 | 63.0 | 31.0 | 39.7 | 30.4 | 56.6 | 74.4 | 57.9 | 62.9 | 90.9 | 53.8 | 56.2 | 56.3 | 63.6 | 32.7 | 31.3 | 62.3 |
| 600 | 69.3 | 39.2 | 32.1 | 26.6 | 63.8 | 69.5 | 55.5 | 68.6 | 88.2 | 63.6 | 72.3 | 55.8 | 74.3 | 35.6 | 39.8 | 69.1 |

peak loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 601 | 74.9 | 34.7 | 49.0 | 48.8 | 67.6 | 71.4 | 57.6 | 50.2 | 94.8 | 74.4 | 57.5 | 55.3 | 52.4 | 42.5 | 30.7 | 50.7 |
| 602 | 52.0 | 29.6 | 43.4 | 44.7 | 57.8 | 69.6 | 72.3 | 59.5 | 92.8 | 74.9 | 52.6 | 54.9 | 55.2 | 47.5 | 45.4 | 76.9 |
| 603 | 69.9 | 42.9 | 41.6 | 45.7 | 63.1 | 54.1 | 53.7 | 71.3 | 93.0 | 55.8 | 67.2 | 53.8 | 57.4 | 29.7 | 45.8 | 58.8 |
| 604 | 70.0 | 47.6 | 32.9 | 38.9 | 68.1 | 63.0 | 58.2 | 63.6 | 90.3 | 57.8 | 65.5 | 55.6 | 54.3 | 40.4 | 43.7 | 75.5 |
| 605 | 61.9 | 36.9 | 47.6 | 41.0 | 67.3 | 56.6 | 52.0 | 62.1 | 82.7 | 70.5 | 52.6 | 70.1 | 63.0 | 26.1 | 33.0 | 65.9 |
| 606 | 53.9 | 28.3 | 44.0 | 42.2 | 66.5 | 69.7 | 68.8 | 66.3 | 83.5 | 74.4 | 60.0 | 55.3 | 56.2 | 34.8 | 28.9 | 75.0 |
| 607 | 59.9 | 39.2 | 46.0 | 31.3 | 59.7 | 53.7 | 57.8 | 61.0 | 87.6 | 74.1 | 58.0 | 50.5 | 66.6 | 49.0 | 40.1 | 66.9 |
| 608 | 67.5 | 45.0 | 41.0 | 39.0 | 65.4 | 53.4 | 67.1 | 67.3 | 93.6 | 70.7 | 69.2 | 52.0 | 61.4 | 42.7 | 37.8 | 58.3 |
| 609 | 61.6 | 41.5 | 26.2 | 34.3 | 69.4 | 66.1 | 54.7 | 60.6 | 94.5 | 70.7 | 60.4 | 58.8 | 63.5 | 29.3 | 42.0 | 54.6 |
| 610 | 75.6 | 38.9 | 42.3 | 39.1 | 63.7 | 64.3 | 70.3 | 50.4 | 85.1 | 64.9 | 70.0 | 67.8 | 50.9 | 46.6 | 32.4 | 51.5 |
| 611 | 70.9 | 27.0 | 46.9 | 36.0 | 73.8 | 67.3 | 71.8 | 69.9 | 81.4 | 70.4 | 52.6 | 51.2 | 59.6 | 35.8 | 35.2 | 50.4 |
| 612 | 62.1 | 48.7 | 29.9 | 31.0 | 67.2 | 51.1 | 67.7 | 50.1 | 82.6 | 51.5 | 69.9 | 56.3 | 56.4 | 47.5 | 46.2 | 55.1 |
| 613 | 57.2 | 32.5 | 47.8 | 31.3 | 58.1 | 58.6 | 67.8 | 50.5 | 91.6 | 52.5 | 69.6 | 74.4 | 67.2 | 26.6 | 49.5 | 73.8 |
| 614 | 68.0 | 41.4 | 25.8 | 41.5 | 53.7 | 74.6 | 69.8 | 52.8 | 90.8 | 70.1 | 60.8 | 63.2 | 62.7 | 36.2 | 37.9 | 72.6 |
| 615 | 65.1 | 42.7 | 32.9 | 28.1 | 58.1 | 55.4 | 68.1 | 62.1 | 94.3 | 72.9 | 66.1 | 73.3 | 55.0 | 43.4 | 39.1 | 67.9 |
| 616 | 76.9 | 43.1 | 44.9 | 25.8 | 59.4 | 54.2 | 73.9 | 57.2 | 84.0 | 65.1 | 63.1 | 53.3 | 53.4 | 47.8 | 41.5 | 69.4 |
| 617 | 76.9 | 27.0 | 35.7 | 33.9 | 74.4 | 70.9 | 61.7 | 63.9 | 84.9 | 63.9 | 74.1 | 58.3 | 66.4 | 25.8 | 35.9 | 63.7 |
| 618 | 65.5 | 26.0 | 37.4 | 48.4 | 54.7 | 58.7 | 62.7 | 68.1 | 82.6 | 61.0 | 67.1 | 70.3 | 67.3 | 48.3 | 44.1 | 75.6 |
| 619 | 64.6 | 41.6 | 47.9 | 50.0 | 67.5 | 72.2 | 60.2 | 66.6 | 85.7 | 70.3 | 58.7 | 50.9 | 71.9 | 41.7 | 42.5 | 64.0 |
| 620 | 51.9 | 49.5 | 28.9 | 31.1 | 54.3 | 54.6 | 59.8 | 66.8 | 92.3 | 58.9 | 54.1 | 69.2 | 60.5 | 41.5 | 38.6 | 70.2 |
| 621 | 77.2 | 34.7 | 44.5 | 27.2 | 64.0 | 57.3 | 70.2 | 59.4 | 92.9 | 59.6 | 65.0 | 71.3 | 57.9 | 35.9 | 34.5 | 65.4 |
| 622 | 79.0 | 32.8 | 30.1 | 43.6 | 52.0 | 68.9 | 55.7 | 53.6 | 93.6 | 55.4 | 70.8 | 60.2 | 62.5 | 48.2 | 28.0 | 66.1 |
| 623 | 64.8 | 49.0 | 42.5 | 40.5 | 74.3 | 55.2 | 59.3 | 73.1 | 84.8 | 73.8 | 73.9 | 66.2 | 65.7 | 28.3 | 36.4 | 64.5 |
| 624 | 53.0 | 33.4 | 27.7 | 28.6 | 71.1 | 64.3 | 63.5 | 55.9 | 94.0 | 68.9 | 65.6 | 73.5 | 51.8 | 35.4 | 43.5 | 74.8 |
| 625 | 53.2 | 37.5 | 29.7 | 33.5 | 70.8 | 70.7 | 55.1 | 53.9 | 82.1 | 61.0 | 70.9 | 54.6 | 52.5 | 28.0 | 43.3 | 69.8 |
| 626 | 60.2 | 30.2 | 45.5 | 31.8 | 73.0 | 64.4 | 58.3 | 62.9 | 83.3 | 61.2 | 57.0 | 65.7 | 59.9 | 39.9 | 44.0 | 50.3 |
| 627 | 74.6 | 36.0 | 43.2 | 41.8 | 57.3 | 61.3 | 64.8 | 74.0 | 92.4 | 59.1 | 55.2 | 63.8 | 59.2 | 26.0 | 36.8 | 53.1 |
| 628 | 73.9 | 30.3 | 34.8 | 40.1 | 72.6 | 73.9 | 73.7 | 55.4 | 82.9 | 62.2 | 71.8 | 73.3 | 72.6 | 28.5 | 28.4 | 77.0 |
| 629 | 54.6 | 31.6 | 25.0 | 32.6 | 60.7 | 68.0 | 64.3 | 72.4 | 88.2 | 60.0 | 50.8 | 53.4 | 53.9 | 49.0 | 29.2 | 60.5 |
| 630 | 51.7 | 45.3 | 34.0 | 43.4 | 56.7 | 72.2 | 63.9 | 50.2 | 84.3 | 52.5 | 57.7 | 59.9 | 72.6 | 25.1 | 28.6 | 77.6 |
| 631 | 56.7 | 25.5 | 25.8 | 49.9 | 60.9 | 54.6 | 59.4 | 63.4 | 94.1 | 64.7 | 54.0 | 74.6 | 66.4 | 43.1 | 34.1 | 66.9 |
| 632 | 61.8 | 47.3 | 38.9 | 37.2 | 60.5 | 58.2 | 73.5 | 51.6 | 83.6 | 73.8 | 66.4 | 58.4 | 73.2 | 26.6 | 49.6 | 67.3 |
| 633 | 65.7 | 27.1 | 34.5 | 31.0 | 56.4 | 55.2 | 61.1 | 68.6 | 81.8 | 51.3 | 56.7 | 74.6 | 73.0 | 26.1 | 28.6 | 79.9 |
| 634 | 58.7 | 45.3 | 42.7 | 28.7 | 66.7 | 51.7 | 64.0 | 58.1 | 89.2 | 57.6 | 72.4 | 64.3 | 50.2 | 49.3 | 49.1 | 73.4 |
| 635 | 63.9 | 26.7 | 27.1 | 35.3 | 56.3 | 60.9 | 64.7 | 71.5 | 87.4 | 63.6 | 64.2 | 73.6 | 66.2 | 26.8 | 35.6 | 76.8 |
| 636 | 67.3 | 30.6 | 40.9 | 42.9 | 74.9 | 63.2 | 50.1 | 67.4 | 93.3 | 70.4 | 73.7 | 63.5 | 50.5 | 34.6 | 45.9 | 56.0 |
| 637 | 51.2 | 33.1 | 44.2 | 39.4 | 51.1 | 58.9 | 63.7 | 52.5 | 84.9 | 53.3 | 74.4 | 66.3 | 62.3 | 46.0 | 31.6 | 51.9 |
| 638 | 64.3 | 37.3 | 33.7 | 45.7 | 71.0 | 66.6 | 74.7 | 61.1 | 80.2 | 59.0 | 57.4 | 60.7 | 55.1 | 46.0 | 29.5 | 52.9 |
| 639 | 70.9 | 30.2 | 29.0 | 36.8 | 71.2 | 70.5 | 63.0 | 51.8 | 92.9 | 61.5 | 67.7 | 56.3 | 53.0 | 43.4 | 40.1 | 68.1 |
| 640 | 76.2 | 38.5 | 41.1 | 41.7 | 71.0 | 64.1 | 74.4 | 69.4 | 91.0 | 53.1 | 53.1 | 73.7 | 71.5 | 29.1 | 34.0 | 61.0 |
| 641 | 55.3 | 32.5 | 44.6 | 32.7 | 63.0 | 58.4 | 62.4 | 70.3 | 82.5 | 59.6 | 73.9 | 53.0 | 57.1 | 42.3 | 36.2 | 78.8 |
| 642 | 58.7 | 29.9 | 45.1 | 27.5 | 71.0 | 64.5 | 64.6 | 72.7 | 91.7 | 62.0 | 72.4 | 62.3 | 67.3 | 32.0 | 25.8 | 66.7 |
| 643 | 76.7 | 26.1 | 36.0 | 26.7 | 59.2 | 69.6 | 53.8 | 54.4 | 86.4 | 70.0 | 65.7 | 51.1 | 64.0 | 32.0 | 36.2 | 56.3 |
| 644 | 52.8 | 32.1 | 45.4 | 35.7 | 70.7 | 59.3 | 61.2 | 64.4 | 89.7 | 56.4 | 73.2 | 54.3 | 57.4 | 38.5 | 32.4 | 72.0 |
| 645 | 56.6 | 45.9 | 38.9 | 42.7 | 64.4 | 68.9 | 56.1 | 70.9 | 90.8 | 55.6 | 52.9 | 50.7 | 52.8 | 32.9 | 48.2 | 77.2 |
| 646 | 53.2 | 26.6 | 35.4 | 49.6 | 51.6 | 74.4 | 55.8 | 52.1 | 86.7 | 53.1 | 66.4 | 58.8 | 70.7 | 41.4 | 27.6 | 70.9 |
| 647 | 74.9 | 43.9 | 48.2 | 35.5 | 50.5 | 67.8 | 58.7 | 67.1 | 94.9 | 60.5 | 54.5 | 71.7 | 73.7 | 27.2 | 29.3 | 63.7 |
| 648 | 52.1 | 30.5 | 33.5 | 30.7 | 62.4 | 67.8 | 50.9 | 55.5 | 91.2 | 63.6 | 74.7 | 63.2 | 69.5 | 32.7 | 31.9 | 70.9 |
| 649 | 69.9 | 46.7 | 45.0 | 44.3 | 53.9 | 72.2 | 50.4 | 51.2 | 84.0 | 68.1 | 69.0 | 56.7 | 65.0 | 42.8 | 44.0 | 51.8 |
| 650 | 56.9 | 36.9 | 27.8 | 49.9 | 59.7 | 51.9 | 52.9 | 65.4 | 86.4 | 67.8 | 57.2 | 52.1 | 71.0 | 48.1 | 34.5 | 58.5 |
| 651 | 52.1 | 38.2 | 36.5 | 32.0 | 74.6 | 51.2 | 74.6 | 62.5 | 87.4 | 53.3 | 66.3 | 65.0 | 65.1 | 40.8 | 44.6 | 56.1 |
| 652 | 67.3 | 35.8 | 32.0 | 37.4 | 73.8 | 56.0 | 53.5 | 73.0 | 92.8 | 71.0 | 69.3 | 71.1 | 71.4 | 45.9 | 47.4 | 69.4 |
| 653 | 53.5 | 26.4 | 41.9 | 41.3 | 58.6 | 51.9 | 72.4 | 63.6 | 90.0 | 59.2 | 64.1 | 53.8 | 65.9 | 39.0 | 42.1 | 61.4 |
| 654 | 78.7 | 37.5 | 39.7 | 35.3 | 66.0 | 73.2 | 54.1 | 56.2 | 88.6 | 52.8 | 59.7 | 59.3 | 50.6 | 42.5 | 27.8 | 78.8 |
| 655 | 52.0 | 44.9 | 28.3 | 29.9 | 64.9 | 69.7 | 74.2 | 53.3 | 84.6 | 72.7 | 73.9 | 59.0 | 61.8 | 30.5 | 31.5 | 77.8 |
| 656 | 59.5 | 48.3 | 33.6 | 49.6 | 50.4 | 64.7 | 53.5 | 68.4 | 90.7 | 52.3 | 67.5 | 69.2 | 61.7 | 28.9 | 25.6 | 50.4 |
| 657 | 61.4 | 32.9 | 45.8 | 28.3 | 65.8 | 72.5 | 72.1 | 50.3 | 85.1 | 72.0 | 57.0 | 70.9 | 53.6 | 28.1 | 39.8 | 64.5 |
| 658 | 53.2 | 43.6 | 48.2 | 41.9 | 67.3 | 57.0 | 73.7 | 52.4 | 85.1 | 72.8 | 53.6 | 52.3 | 61.4 | 27.1 | 37.2 | 73.4 |
| 659 | 52.5 | 25.9 | 30.5 | 31.6 | 68.3 | 73.6 | 62.7 | 62.8 | 82.1 | 62.2 | 71.0 | 70.3 | 69.9 | 37.4 | 28.3 | 66.7 |
| 660 | 61.7 | 48.0 | 34.5 | 46.0 | 60.8 | 51.7 | 73.8 | 73.9 | 83.2 | 66.5 | 54.0 | 51.1 | 69.7 | 39.1 | 35.9 | 53.4 |
| 661 | 50.1 | 27.1 | 49.3 | 40.2 | 59.7 | 51.5 | 63.8 | 55.4 | 91.8 | 71.7 | 71.0 | 56.5 | 71.0 | 33.4 | 39.2 | 75.2 |
| 662 | 54.3 | 33.7 | 32.5 | 27.9 | 55.8 | 50.6 | 66.6 | 55.3 | 94.4 | 51.4 | 50.1 | 58.3 | 66.8 | 39.2 | 44.5 | 70.5 |
| 663 | 63.0 | 33.7 | 35.5 | 36.3 | 53.8 | 72.8 | 66.8 | 55.0 | 84.7 | 66.7 | 74.0 | 64.7 | 64.8 | 32.8 | 45.8 | 51.7 |
| 664 | 74.2 | 43.5 | 35.5 | 29.7 | 61.6 | 74.9 | 53.5 | 50.4 | 91.5 | 74.3 | 60.8 | 70.3 | 69.0 | 37.2 | 32.8 | 60.9 |
| 665 | 51.6 | 46.7 | 40.2 | 34.0 | 56.6 | 64.2 | 64.9 | 74.3 | 93.5 | 55.5 | 70.0 | 53.2 | 52.6 | 25.6 | 49.6 | 64.6 |
| 666 | 61.1 | 43.8 | 31.1 | 48.8 | 72.4 | 60.7 | 55.3 | 66.3 | 86.1 | 61.8 | 73.0 | 69.6 | 69.9 | 42.9 | 42.0 | 56.8 |
| 667 | 67.5 | 36.4 | 33.9 | 46.7 | 62.9 | 57.6 | 65.5 | 60.8 | 89.5 | 57.0 | 64.7 | 60.7 | 58.3 | 42.1 | 27.6 | 54.6 |
| 668 | 62.2 | 27.6 | 38.9 | 41.6 | 67.4 | 57.4 | 68.8 | 58.7 | 94.0 | 73.7 | 53.8 | 50.4 | 74.0 | 42.3 | 47.8 | 69.1 |
| 669 | 56.2 | 25.1 | 28.1 | 39.0 | 53.5 | 52.5 | 63.2 | 56.6 | 94.2 | 67.4 | 63.5 | 59.0 | 59.6 | 48.0 | 38.2 | 77.8 |
| 670 | 78.6 | 26.6 | 30.7 | 49.4 | 65.8 | 66.2 | 72.5 | 68.1 | 85.1 | 73.9 | 65.9 | 58.7 | 56.4 | 35.9 | 37.9 | 61.6 |
| 671 | 69.7 | 29.4 | 34.6 | 48.3 | 68.4 | 73.4 | 70.9 | 58.4 | 87.3 | 68.2 | 72.5 | 61.8 | 61.6 | 47.2 | 35.7 | 58.9 |
| 672 | 54.9 | 43.7 | 34.0 | 26.7 | 70.8 | 63.7 | 53.0 | 70.7 | 85.2 | 56.0 | 68.0 | 60.2 | 64.3 | 37.9 | 36.1 | 76.8 |
| 673 | 61.6 | 29.6 | 49.2 | 31.6 | 54.2 | 52.9 | 59.7 | 72.9 | 83.5 | 69.1 | 68.3 | 52.5 | 68.9 | 45.9 | 35.6 | 51.9 |
| 674 | 56.3 | 40.4 | 44.4 | 49.5 | 56.0 | 69.6 | 72.2 | 50.8 | 81.2 | 67.8 | 54.3 | 55.6 | 51.8 | 42.3 | 45.9 | 54.4 |
| 675 | 72.3 | 27.8 | 42.4 | 27.1 | 60.7 | 63.6 | 52.4 | 66.0 | 84.1 | 54.1 | 62.2 | 33.6 | 68.0 | 41.7 | 29.8 | 62.2 |

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | peak loads for cycle # | | | | | | | | | |
| 676 | 69.8 | 41.9 | 36.9 | 27.5 | 58.8 | 70.2 | 65.6 | 70.6 | 94.5 | 56.6 | 58.1 | 52.1 | 66.2 | 34.7 | 48.4 | 50.1 |
| 677 | 66.9 | 26.8 | 32.8 | 42.9 | 62.5 | 59.9 | 69.8 | 67.2 | 85.6 | 50.6 | 54.8 | 65.8 | 56.6 | 45.0 | 30.9 | 73.7 |
| 678 | 51.6 | 45.0 | 48.2 | 43.0 | 71.8 | 54.0 | 74.0 | 71.1 | 94.1 | 58.5 | 54.8 | 62.8 | 51.4 | 26.0 | 37.2 | 58.8 |
| 679 | 75.5 | 33.2 | 26.9 | 44.8 | 57.0 | 50.7 | 50.8 | 57.4 | 82.4 | 62.7 | 65.5 | 65.3 | 69.5 | 34.7 | 35.7 | 76.9 |
| 680 | 74.7 | 46.1 | 45.1 | 33.2 | 56.8 | 70.3 | 68.7 | 53.5 | 92.1 | 69.1 | 67.1 | 61.2 | 55.3 | 47.2 | 31.5 | 75.1 |
| 681 | 72.9 | 37.8 | 27.0 | 36.4 | 57.8 | 51.7 | 56.4 | 52.6 | 86.3 | 61.8 | 52.5 | 68.0 | 61.7 | 46.2 | 27.5 | 53.4 |
| 682 | 54.4 | 45.5 | 35.9 | 42.5 | 69.3 | 50.5 | 52.1 | 63.6 | 87.4 | 65.7 | 63.1 | 50.3 | 51.6 | 36.2 | 25.2 | 66.7 |
| 683 | 76.1 | 36.6 | 32.9 | 25.5 | 56.8 | 61.5 | 56.9 | 66.5 | 92.7 | 55.0 | 66.5 | 51.1 | 53.8 | 32.0 | 48.0 | 62.4 |
| 684 | 52.7 | 38.2 | 48.2 | 34.5 | 51.0 | 60.2 | 51.7 | 62.8 | 93.2 | 63.9 | 52.2 | 61.5 | 56.5 | 34.4 | 43.4 | 78.4 |
| 685 | 58.5 | 37.9 | 46.1 | 25.5 | 58.4 | 69.4 | 62.6 | 57.2 | 80.5 | 64.4 | 55.5 | 65.7 | 58.5 | 41.7 | 47.7 | 51.1 |
| 686 | 54.8 | 47.3 | 36.9 | 29.6 | 73.2 | 61.4 | 64.6 | 74.3 | 80.8 | 60.9 | 56.9 | 62.4 | 55.1 | 40.7 | 37.5 | 64.5 |
| 687 | 64.2 | 26.6 | 49.0 | 26.0 | 69.7 | 64.7 | 51.7 | 51.1 | 91.2 | 52.6 | 66.1 | 56.7 | 69.4 | 29.0 | 28.5 | 71.7 |
| 688 | 58.1 | 35.4 | 44.4 | 37.7 | 65.5 | 55.4 | 71.8 | 50.4 | 89.2 | 62.9 | 61.4 | 68.3 | 62.9 | 37.0 | 32.3 | 74.4 |
| 689 | 66.7 | 26.4 | 25.7 | 35.0 | 54.9 | 69.1 | 65.6 | 65.0 | 84.7 | 56.2 | 56.9 | 53.4 | 69.7 | 36.3 | 25.8 | 79.0 |
| 690 | 57.9 | 42.0 | 33.1 | 45.4 | 62.1 | 67.1 | 52.2 | 57.9 | 86.2 | 57.3 | 68.9 | 53.4 | 67.4 | 49.7 | 42.7 | 58.3 |
| 691 | 78.7 | 42.2 | 46.4 | 40.2 | 63.7 | 73.6 | 58.6 | 60.3 | 88.0 | 52.2 | 58.4 | 69.1 | 63.2 | 35.1 | 33.0 | 64.5 |
| 692 | 55.7 | 32.4 | 46.1 | 36.2 | 57.2 | 51.4 | 67.8 | 68.1 | 94.9 | 56.3 | 68.7 | 57.8 | 53.6 | 46.0 | 43.5 | 58.4 |
| 693 | 66.9 | 40.0 | 28.1 | 38.4 | 73.7 | 53.4 | 71.7 | 69.2 | 86.4 | 52.3 | 52.8 | 58.7 | 52.8 | 47.2 | 45.6 | 68.3 |
| 694 | 65.5 | 44.5 | 36.7 | 44.7 | 53.8 | 71.6 | 56.9 | 62.6 | 82.0 | 58.3 | 59.2 | 54.6 | 65.9 | 33.6 | 42.9 | 76.8 |
| 695 | 68.7 | 37.9 | 36.9 | 41.8 | 53.8 | 67.0 | 52.6 | 57.0 | 87.7 | 69.6 | 61.3 | 51.7 | 56.5 | 47.9 | 40.9 | 65.6 |
| 696 | 70.2 | 35.5 | 47.0 | 41.4 | 58.7 | 67.1 | 60.0 | 55.8 | 92.2 | 60.0 | 52.0 | 57.5 | 62.8 | 27.9 | 38.7 | 55.0 |
| 697 | 74.7 | 28.8 | 49.0 | 48.5 | 68.0 | 62.7 | 74.2 | 70.6 | 90.6 | 64.0 | 67.1 | 61.6 | 53.0 | 45.0 | 37.3 | 73.8 |
| 698 | 65.8 | 32.1 | 48.6 | 29.5 | 69.0 | 72.7 | 73.2 | 67.9 | 88.9 | 52.6 | 67.7 | 64.8 | 52.5 | 38.3 | 27.3 | 74.4 |
| 699 | 57.6 | 33.2 | 40.3 | 32.0 | 57.2 | 65.7 | 56.5 | 73.0 | 83.5 | 55.3 | 50.8 | 54.5 | 52.3 | 37.1 | 44.7 | 65.3 |
| 700 | 66.9 | 35.5 | 28.2 | 46.3 | 65.7 | 57.2 | 61.1 | 53.8 | 91.2 | 67.2 | 50.7 | 62.2 | 56.9 | 41.9 | 43.0 | 67.2 |
| 701 | 72.5 | 45.5 | 41.3 | 25.2 | 74.8 | 55.5 | 53.9 | 65.2 | 90.8 | 53.8 | 54.7 | 55.5 | 54.8 | 37.7 | 36.8 | 63.6 |
| 702 | 50.7 | 29.4 | 40.6 | 42.2 | 57.3 | 71.2 | 73.9 | 63.5 | 86.6 | 51.9 | 61.3 | 52.2 | 62.0 | 41.6 | 39.7 | 76.7 |
| 703 | 50.2 | 39.0 | 36.4 | 44.2 | 61.3 | 52.9 | 50.4 | 55.3 | 84.3 | 61.3 | 63.1 | 64.4 | 63.0 | 36.4 | 29.6 | 56.1 |
| 704 | 77.4 | 44.9 | 41.5 | 33.7 | 68.6 | 71.6 | 58.9 | 65.4 | 94.9 | 63.0 | 59.8 | 54.7 | 53.9 | 49.8 | 40.9 | 54.1 |
| 705 | 58.4 | 39.4 | 28.5 | 25.6 | 51.2 | 68.6 | 52.4 | 69.6 | 81.8 | 60.5 | 65.8 | 66.8 | 59.6 | 43.0 | 47.9 | 60.5 |
| 706 | 53.4 | 39.6 | 45.0 | 35.3 | 73.8 | 72.1 | 71.2 | 64.5 | 84.1 | 68.1 | 69.8 | 57.4 | 63.9 | 47.4 | 30.3 | 79.0 |
| 707 | 74.7 | 25.4 | 40.5 | 35.7 | 58.3 | 63.8 | 56.6 | 57.5 | 82.0 | 61.9 | 66.0 | 66.3 | 60.3 | 28.3 | 27.9 | 67.4 |
| 708 | 53.3 | 48.8 | 26.2 | 33.9 | 72.6 | 68.0 | 59.6 | 72.1 | 85.5 | 50.6 | 69.3 | 63.4 | 63.4 | 47.5 | 34.2 | 53.3 |
| 709 | 77.2 | 41.3 | 41.9 | 35.1 | 66.5 | 69.4 | 52.5 | 56.7 | 89.7 | 53.7 | 63.5 | 64.1 | 60.5 | 26.9 | 49.8 | 53.8 |
| 710 | 79.6 | 32.5 | 41.2 | 42.4 | 65.0 | 65.2 | 71.9 | 67.3 | 90.3 | 57.9 | 65.7 | 58.4 | 57.7 | 31.7 | 44.7 | 57.6 |
| 711 | 63.0 | 27.5 | 39.6 | 42.9 | 58.3 | 51.4 | 52.2 | 60.6 | 80.3 | 54.2 | 53.4 | 55.6 | 58.2 | 31.4 | 35.7 | 59.3 |
| 712 | 52.9 | 37.1 | 37.8 | 49.0 | 65.4 | 67.9 | 72.0 | 64.0 | 94.1 | 50.5 | 53.7 | 67.9 | 64.5 | 33.3 | 45.6 | 63.9 |
| 713 | 62.0 | 37.1 | 29.1 | 29.4 | 57.3 | 55.2 | 65.0 | 71.1 | 86.3 | 50.5 | 53.4 | 51.5 | 57.3 | 38.8 | 49.8 | 78.6 |
| 714 | 59.6 | 36.2 | 44.3 | 26.2 | 68.8 | 67.3 | 66.1 | 64.8 | 91.6 | 53.3 | 67.9 | 57.6 | 60.0 | 47.1 | 42.5 | 59.8 |
| 715 | 74.0 | 26.2 | 44.3 | 39.4 | 58.9 | 66.3 | 68.9 | 52.2 | 94.5 | 67.7 | 61.5 | 59.6 | 64.0 | 38.3 | 40.0 | 58.4 |
| 716 | 70.7 | 25.4 | 30.1 | 45.8 | 64.5 | 57.6 | 63.3 | 68.1 | 88.8 | 57.4 | 67.5 | 62.8 | 63.9 | 46.3 | 41.6 | 67.8 |
| 717 | 66.8 | 26.1 | 47.8 | 36.9 | 65.5 | 69.3 | 65.4 | 64.6 | 87.9 | 67.5 | 54.3 | 50.9 | 64.6 | 32.8 | 36.7 | 74.7 |
| 718 | 55.6 | 27.5 | 32.2 | 31.7 | 59.0 | 66.0 | 65.1 | 68.5 | 85.3 | 57.2 | 57.4 | 53.6 | 61.6 | 41.6 | 31.8 | 57.0 |
| 719 | 60.8 | 40.2 | 40.7 | 41.5 | 58.8 | 67.6 | 56.2 | 64.3 | 93.9 | 65.4 | 55.5 | 56.3 | 66.4 | 28.0 | 40.2 | 77.8 |
| 720 | 70.8 | 32.1 | 28.9 | 25.8 | 50.5 | 66.0 | 51.7 | 51.4 | 94.9 | 69.3 | 66.8 | 65.3 | 53.0 | 35.5 | 48.2 | 57.4 |
| 721 | 62.5 | 25.4 | 42.1 | 37.1 | 50.1 | 63.8 | 60.9 | 61.8 | 91.1 | 70.0 | 64.1 | 56.9 | 69.8 | 27.3 | 32.5 | 67.7 |
| 722 | 53.0 | 44.9 | 34.9 | 27.8 | 50.4 | 61.5 | 67.2 | 58.8 | 87.2 | 52.7 | 53.1 | 52.9 | 65.1 | 39.5 | 39.1 | 52.3 |
| 723 | 63.0 | 28.3 | 28.0 | 27.5 | 66.2 | 55.1 | 52.0 | 64.4 | 92.6 | 67.0 | 52.2 | 53.6 | 68.0 | 43.4 | 45.6 | 73.5 |
| 724 | 56.2 | 27.5 | 29.1 | 29.7 | 55.6 | 57.9 | 58.0 | 61.2 | 91.0 | 55.4 | 57.8 | 64.4 | 50.2 | 31.7 | 37.8 | 76.6 |
| 725 | 54.6 | 28.0 | 46.1 | 44.3 | 61.5 | 55.2 | 50.5 | 57.1 | 81.0 | 68.1 | 57.5 | 50.4 | 66.8 | 41.4 | 38.9 | 79.9 |
| 726 | 65.5 | 36.5 | 27.2 | 30.7 | 59.2 | 62.7 | 60.5 | 50.1 | 94.0 | 69.3 | 58.0 | 52.5 | 59.0 | 36.2 | 33.1 | 59.3 |
| 727 | 55.8 | 34.5 | 39.4 | 32.2 | 57.3 | 54.2 | 51.8 | 59.6 | 91.0 | 50.6 | 54.9 | 54.1 | 63.4 | 46.3 | 48.5 | 74.8 |
| 728 | 73.4 | 42.4 | 37.4 | 37.8 | 63.0 | 56.0 | 50.5 | 67.3 | 81.5 | 54.3 | 55.3 | 55.7 | 55.0 | 36.1 | 48.6 | 72.2 |
| 729 | 54.2 | 27.8 | 36.5 | 48.0 | 50.2 | 60.4 | 68.6 | 57.1 | 90.3 | 69.6 | 59.9 | 68.5 | 52.8 | 46.0 | 28.7 | 51.1 |
| 730 | 77.1 | 49.4 | 47.8 | 35.5 | 67.1 | 68.2 | 61.2 | 62.1 | 94.4 | 52.7 | 64.7 | 60.2 | 56.5 | 25.1 | 33.8 | 55.6 |
| 731 | 51.2 | 31.8 | 25.4 | 29.7 | 63.3 | 67.7 | 60.7 | 52.7 | 90.7 | 67.7 | 64.6 | 65.7 | 52.1 | 34.9 | 32.9 | 51.8 |
| 732 | 50.3 | 30.9 | 32.4 | 47.3 | 67.4 | 54.4 | 58.8 | 58.5 | 84.5 | 52.6 | 66.2 | 63.4 | 56.0 | 39.3 | 28.2 | 78.0 |
| 733 | 58.2 | 39.8 | 41.6 | 27.2 | 59.8 | 50.2 | 60.0 | 52.3 | 80.5 | 65.4 | 65.8 | 59.6 | 61.2 | 30.2 | 36.8 | 71.0 |
| 734 | 67.7 | 28.0 | 41.7 | 38.1 | 55.1 | 51.2 | 55.6 | 63.0 | 92.0 | 68.1 | 52.0 | 51.6 | 66.5 | 31.5 | 34.2 | 78.3 |
| 735 | 77.9 | 29.2 | 47.9 | 35.3 | 60.3 | 66.3 | 56.3 | 57.0 | 86.7 | 56.0 | 64.1 | 64.5 | 68.8 | 32.8 | 45.0 | 71.3 |
| 736 | 65.8 | 31.6 | 33.0 | 46.0 | 60.5 | 65.9 | 63.0 | 51.6 | 84.6 | 54.3 | 52.8 | 57.9 | 63.1 | 40.3 | 29.6 | 50.7 |
| 737 | 54.2 | 31.6 | 33.1 | 38.5 | 53.0 | 61.1 | 51.1 | 57.3 | 89.4 | 59.2 | 61.3 | 50.4 | 68.6 | 27.4 | 45.0 | 62.4 |
| 738 | 79.7 | 43.8 | 47.2 | 38.5 | 62.0 | 61.9 | 62.3 | 54.7 | 80.7 | 63.4 | 58.2 | 57.7 | 54.1 | 44.7 | 44.2 | 79.5 |
| 739 | 51.6 | 46.1 | 49.6 | 35.2 | 59.4 | 64.4 | 60.1 | 55.9 | 91.1 | 51.4 | 53.9 | 53.2 | 51.5 | 25.5 | 41.0 | 69.6 |
| 740 | 58.1 | 25.1 | 47.9 | 30.0 | 52.7 | 63.1 | 62.7 | 57.5 | 89.8 | 66.2 | 58.3 | 58.9 | 60.1 | 35.4 | 45.1 | 74.0 |
| 741 | 59.3 | 46.5 | 33.5 | 42.9 | 57.5 | 67.0 | 62.5 | 60.8 | 93.3 | 68.9 | 59.1 | 60.2 | 59.4 | 27.6 | 40.2 | 63.0 |
| 742 | 60.3 | 35.6 | 27.3 | 48.3 | 69.6 | 60.6 | 56.8 | 64.4 | 86.6 | 69.3 | 56.8 | 52.3 | 54.0 | 32.8 | 46.7 | 56.1 |
| 743 | 55.2 | 45.3 | 49.1 | 46.9 | 63.8 | 67.0 | 68.5 | 61.5 | 93.7 | 50.5 | 57.8 | 63.2 | 56.9 | 35.3 | 30.8 | 76.0 |
| 744 | 74.0 | 41.0 | 35.0 | 37.0 | 52.3 | 57.3 | 64.8 | 54.6 | 92.8 | 54.0 | 57.5 | 57.5 | 55.7 | 29.1 | 35.9 | 50.1 |
| 745 | 70.1 | 28.5 | 41.1 | 28.2 | 56.5 | 68.2 | 55.9 | 59.7 | 82.0 | 60.2 | 50.5 | 52.0 | 65.8 | 35.7 | 40.6 | 51.8 |
| 746 | 65.3 | 25.0 | 46.7 | 38.0 | 54.7 | 63.2 | 57.8 | 63.1 | 91.8 | 52.6 | 50.2 | 54.9 | 56.2 | 46.9 | 45.7 | 56.9 |
| 747 | 74.0 | 32.8 | 49.3 | 42.5 | 55.5 | 67.8 | 64.5 | 62.9 | 84.6 | 55.2 | 55.2 | 50.5 | 53.4 | 34.5 | 48.4 | 55.1 |
| 748 | 77.3 | 45.5 | 41.0 | 38.3 | 68.7 | 53.6 | 50.4 | 53.2 | 84.9 | 69.6 | 50.1 | 69.8 | 51.8 | 36.0 | 46.1 | 59.0 |
| 749 | 56.6 | 39.7 | 45.7 | 48.3 | 52.2 | 55.3 | 58.9 | 66.4 | 85.5 | 55.3 | 50.9 | 70.0 | 68.1 | 49.4 | 37.7 | 74.2 |
| 750 | 53.5 | 32.9 | 38.8 | 40.9 | 63.8 | 55.3 | 54.9 | 64.8 | 84.8 | 60.5 | 60.9 | 68.7 | 66.2 | 26.0 | 40.7 | 51.5 |

peak loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 751 | 50.8 | 49.7 | 25.6 | 44.2 | 64.4 | 65.0 | 60.5 | 58.2 | 92.1 | 54.3 | 67.4 | 51.0 | 66.4 | 36.9 | 34.2 | 51.9 |
| 752 | 58.5 | 43.8 | 28.5 | 39.4 | 53.8 | 64.7 | 68.6 | 60.2 | 93.5 | 53.1 | 55.9 | 66.9 | 68.3 | 44.1 | 41.6 | 73.4 |
| 753 | 79.5 | 45.5 | 45.7 | 31.3 | 54.2 | 57.7 | 51.0 | 67.9 | 89.4 | 62.1 | 55.0 | 67.0 | 53.6 | 38.4 | 40.0 | 65.5 |
| 754 | 66.2 | 41.0 | 26.8 | 37.2 | 62.8 | 69.4 | 69.9 | 51.3 | 88.8 | 54.2 | 58.6 | 62.0 | 54.7 | 47.4 | 41.5 | 68.5 |
| 755 | 51.9 | 44.0 | 38.9 | 37.5 | 51.6 | 60.3 | 51.6 | 50.6 | 94.8 | 67.7 | 60.6 | 50.3 | 50.7 | 36.5 | 36.7 | 64.6 |
| 756 | 54.0 | 26.0 | 26.5 | 34.7 | 59.8 | 67.4 | 59.4 | 66.7 | 90.7 | 64.1 | 53.1 | 68.4 | 68.7 | 47.2 | 30.6 | 60.0 |
| 757 | 54.3 | 45.9 | 47.0 | 41.2 | 64.2 | 54.6 | 68.1 | 52.0 | 92.5 | 55.5 | 53.8 | 55.2 | 69.9 | 44.4 | 36.9 | 55.6 |
| 758 | 79.1 | 37.5 | 35.0 | 30.5 | 68.8 | 68.7 | 59.2 | 68.9 | 84.7 | 62.3 | 63.6 | 60.3 | 60.5 | 28.4 | 44.0 | 59.4 |
| 759 | 78.5 | 35.8 | 39.1 | 44.6 | 64.0 | 69.7 | 59.8 | 57.3 | 85.5 | 66.6 | 63.4 | 59.0 | 68.1 | 32.3 | 31.3 | 70.7 |
| 760 | 74.1 | 45.2 | 27.7 | 45.6 | 54.6 | 56.9 | 51.2 | 51.1 | 93.7 | 66.6 | 59.7 | 51.0 | 50.3 | 35.8 | 28.3 | 51.0 |
| 761 | 61.5 | 37.7 | 39.3 | 26.4 | 63.6 | 51.3 | 61.2 | 69.0 | 81.6 | 52.7 | 50.1 | 58.0 | 59.5 | 49.9 | 25.8 | 62.0 |
| 762 | 62.2 | 42.6 | 44.5 | 46.6 | 66.7 | 56.7 | 69.7 | 51.9 | 94.6 | 56.9 | 54.0 | 60.9 | 61.1 | 44.0 | 32.7 | 75.2 |
| 763 | 72.8 | 46.7 | 26.7 | 45.8 | 55.3 | 68.1 | 55.3 | 50.8 | 80.7 | 56.7 | 57.8 | 62.1 | 60.3 | 38.1 | 30.9 | 58.0 |
| 764 | 67.3 | 46.1 | 43.6 | 37.7 | 62.0 | 68.9 | 55.6 | 60.8 | 80.9 | 63.6 | 61.9 | 68.7 | 63.8 | 32.1 | 29.4 | 65.1 |
| 765 | 78.1 | 33.0 | 26.2 | 29.6 | 63.6 | 67.2 | 61.1 | 51.5 | 92.0 | 64.3 | 61.3 | 56.1 | 53.3 | 35.4 | 34.2 | 71.2 |
| 766 | 76.7 | 49.8 | 45.7 | 27.5 | 65.3 | 66.8 | 52.5 | 51.6 | 84.7 | 55.5 | 55.4 | 64.3 | 54.7 | 29.5 | 40.7 | 70.9 |
| 767 | 61.2 | 47.7 | 42.5 | 43.7 | 55.0 | 64.3 | 57.7 | 67.9 | 88.7 | 69.7 | 58.2 | 69.8 | 66.0 | 46.9 | 30.8 | 52.8 |
| 768 | 50.9 | 46.6 | 31.3 | 41.3 | 53.4 | 66.9 | 58.6 | 55.3 | 87.2 | 66.1 | 51.5 | 50.8 | 68.0 | 41.7 | 38.3 | 78.7 |
| 769 | 64.4 | 47.1 | 46.9 | 45.6 | 62.0 | 69.3 | 60.3 | 63.7 | 83.5 | 58.1 | 54.1 | 58.9 | 64.4 | 42.6 | 35.8 | 52.0 |
| 770 | 62.4 | 49.9 | 31.8 | 45.3 | 60.5 | 67.5 | 66.8 | 63.5 | 93.3 | 68.6 | 56.8 | 52.1 | 52.3 | 40.4 | 36.2 | 74.6 |
| 771 | 79.1 | 31.9 | 33.6 | 34.2 | 61.2 | 65.6 | 50.4 | 68.2 | 87.6 | 59.9 | 69.3 | 52.3 | 65.7 | 28.0 | 43.4 | 74.2 |
| 772 | 69.7 | 43.5 | 40.5 | 46.1 | 67.2 | 63.0 | 68.7 | 52.9 | 89.6 | 63.7 | 56.1 | 57.2 | 63.9 | 31.0 | 35.8 | 79.4 |
| 773 | 59.1 | 29.7 | 36.7 | 37.2 | 59.8 | 60.8 | 60.2 | 57.9 | 92.5 | 59.7 | 52.1 | 51.1 | 59.8 | 29.3 | 35.7 | 56.9 |
| 774 | 73.1 | 34.4 | 47.6 | 26.9 | 61.0 | 63.0 | 56.2 | 59.7 | 80.4 | 55.1 | 66.2 | 65.3 | 56.0 | 32.6 | 47.8 | 55.4 |
| 775 | 69.4 | 25.7 | 47.3 | 25.5 | 62.4 | 58.5 | 67.3 | 52.8 | 91.8 | 63.2 | 69.9 | 67.0 | 51.0 | 35.7 | 34.3 | 75.0 |
| 776 | 60.6 | 43.5 | 39.8 | 40.8 | 59.6 | 56.5 | 51.6 | 50.3 | 87.7 | 65.6 | 53.0 | 67.4 | 50.6 | 44.4 | 45.7 | 66.7 |
| 777 | 52.0 | 32.3 | 26.8 | 32.6 | 62.2 | 55.8 | 53.1 | 65.0 | 82.3 | 60.2 | 66.6 | 61.3 | 68.6 | 49.6 | 25.7 | 55.6 |
| 778 | 75.8 | 31.2 | 42.1 | 46.5 | 54.1 | 67.4 | 59.4 | 65.8 | 86.1 | 54.2 | 53.3 | 61.5 | 52.2 | 45.5 | 36.7 | 50.5 |
| 779 | 52.6 | 47.3 | 31.9 | 27.1 | 70.0 | 69.0 | 54.3 | 64.4 | 88.0 | 62.4 | 52.2 | 61.0 | 56.0 | 39.5 | 26.7 | 71.1 |
| 780 | 55.2 | 44.8 | 26.6 | 37.1 | 68.9 | 68.6 | 58.3 | 64.6 | 83.6 | 54.0 | 61.6 | 67.1 | 58.8 | 44.9 | 29.2 | 53.0 |
| 781 | 52.9 | 43.2 | 45.1 | 30.2 | 52.0 | 50.1 | 64.8 | 57.7 | 82.1 | 66.5 | 69.8 | 54.9 | 61.8 | 33.8 | 35.6 | 64.2 |
| 782 | 72.7 | 27.4 | 34.7 | 43.0 | 60.5 | 54.7 | 63.3 | 66.1 | 88.2 | 51.2 | 55.5 | 57.7 | 66.7 | 29.1 | 32.5 | 66.4 |
| 783 | 59.6 | 37.5 | 49.9 | 41.5 | 51.4 | 63.9 | 67.9 | 62.9 | 88.9 | 62.3 | 52.6 | 60.5 | 58.7 | 38.5 | 42.7 | 71.0 |
| 784 | 79.9 | 25.7 | 46.7 | 33.5 | 60.4 | 54.4 | 57.8 | 57.7 | 80.1 | 61.0 | 53.7 | 62.5 | 51.5 | 45.8 | 33.0 | 69.9 |
| 785 | 58.4 | 42.5 | 40.9 | 42.3 | 55.9 | 61.4 | 63.4 | 53.7 | 85.8 | 63.9 | 55.0 | 67.5 | 65.4 | 41.4 | 32.4 | 56.3 |
| 786 | 52.6 | 30.0 | 26.4 | 34.9 | 66.4 | 66.4 | 59.4 | 63.6 | 88.6 | 53.1 | 63.7 | 57.8 | 67.9 | 38.0 | 25.0 | 54.4 |
| 787 | 52.6 | 42.6 | 35.4 | 49.0 | 64.1 | 63.3 | 66.0 | 55.8 | 86.0 | 68.7 | 66.7 | 60.5 | 63.2 | 40.9 | 38.6 | 70.6 |
| 788 | 63.3 | 30.5 | 37.2 | 44.0 | 55.7 | 51.6 | 68.1 | 52.1 | 87.5 | 68.1 | 68.4 | 55.3 | 69.9 | 47.2 | 35.8 | 55.5 |
| 789 | 54.5 | 25.0 | 46.6 | 41.6 | 50.8 | 57.2 | 59.6 | 57.6 | 84.1 | 59.5 | 58.2 | 62.5 | 65.1 | 37.5 | 40.6 | 66.4 |
| 790 | 63.9 | 32.2 | 35.8 | 40.3 | 65.8 | 55.2 | 66.0 | 61.5 | 89.2 | 53.8 | 50.7 | 66.0 | 61.3 | 42.5 | 28.2 | 72.4 |
| 791 | 66.3 | 28.0 | 47.6 | 49.5 | 62.8 | 60.7 | 57.2 | 61.7 | 90.0 | 58.7 | 58.0 | 63.3 | 68.5 | 25.7 | 48.6 | 62.2 |
| 792 | 51.5 | 48.8 | 36.3 | 31.9 | 54.9 | 57.3 | 65.5 | 61.0 | 82.3 | 58.7 | 54.9 | 51.9 | 58.6 | 28.6 | 40.0 | 76.0 |
| 793 | 75.0 | 49.6 | 28.4 | 44.7 | 57.2 | 60.9 | 59.5 | 59.0 | 81.8 | 51.1 | 52.0 | 51.1 | 65.2 | 27.4 | 47.8 | 56.3 |
| 794 | 74.2 | 33.0 | 40.1 | 34.6 | 69.7 | 61.2 | 69.9 | 59.4 | 86.4 | 56.2 | 64.0 | 65.2 | 59.5 | 30.5 | 26.4 | 56.9 |
| 795 | 70.2 | 29.7 | 29.6 | 31.9 | 60.1 | 64.2 | 50.6 | 66.8 | 88.2 | 65.4 | 55.0 | 67.7 | 61.3 | 32.7 | 27.3 | 53.9 |
| 796 | 79.8 | 41.8 | 36.6 | 46.6 | 68.6 | 55.4 | 57.8 | 64.2 | 87.0 | 68.9 | 61.6 | 53.1 | 62.0 | 36.7 | 36.4 | 70.6 |
| 797 | 63.6 | 27.1 | 32.6 | 39.7 | 64.4 | 67.8 | 68.8 | 52.9 | 83.6 | 66.1 | 55.5 | 59.1 | 64.4 | 34.6 | 25.8 | 52.4 |
| 798 | 73.3 | 42.8 | 36.5 | 26.0 | 68.8 | 66.0 | 59.5 | 50.8 | 87.9 | 61.7 | 64.9 | 62.5 | 59.2 | 40.2 | 34.3 | 52.4 |
| 799 | 62.5 | 36.3 | 41.1 | 40.6 | 69.2 | 63.4 | 59.5 | 63.0 | 88.9 | 53.2 | 58.0 | 61.6 | 64.6 | 26.5 | 34.6 | 60.1 |
| 800 | 75.1 | 33.6 | 25.2 | 49.9 | 66.7 | 64.5 | 58.4 | 65.2 | 80.2 | 61.6 | 67.3 | 67.1 | 58.1 | 41.7 | 31.0 | 69.8 |
| 801 | 69.6 | 35.5 | 45.1 | 47.3 | 62.1 | 65.5 | 69.5 | 63.3 | 85.0 | 64.2 | 62.3 | 54.7 | 68.2 | 43.2 | 49.2 | 72.6 |
| 802 | 67.0 | 25.9 | 34.4 | 46.3 | 64.1 | 60.9 | 67.7 | 51.2 | 87.0 | 57.3 | 65.4 | 66.6 | 69.6 | 36.1 | 46.0 | 60.0 |
| 803 | 66.2 | 49.1 | 32.4 | 30.6 | 62.0 | 52.9 | 68.4 | 52.1 | 85.0 | 59.2 | 57.6 | 52.1 | 66.3 | 45.9 | 31.7 | 68.2 |
| 804 | 67.3 | 26.6 | 40.3 | 43.4 | 61.9 | 62.9 | 67.2 | 65.3 | 85.3 | 59.2 | 57.6 | 50.2 | 69.9 | 42.6 | 44.4 | 68.3 |
| 805 | 56.8 | 25.3 | 36.6 | 33.4 | 62.8 | 53.8 | 53.7 | 53.3 | 81.3 | 62.8 | 63.2 | 63.7 | 52.1 | 34.5 | 49.5 | 71.0 |
| 806 | 50.5 | 34.0 | 45.0 | 30.5 | 58.8 | 52.7 | 57.3 | 55.8 | 85.8 | 51.5 | 61.1 | 58.0 | 64.5 | 25.3 | 39.3 | 78.9 |
| 807 | 57.0 | 36.5 | 38.2 | 26.5 | 53.5 | 56.1 | 52.5 | 58.1 | 80.2 | 64.6 | 63.4 | 65.3 | 56.8 | 26.0 | 25.1 | 68.2 |
| 808 | 53.2 | 41.5 | 37.8 | 45.9 | 60.2 | 58.3 | 53.7 | 59.4 | 89.5 | 52.8 | 54.6 | 55.9 | 61.4 | 38.9 | 48.4 | 80.0 |
| 809 | 70.5 | 38.4 | 47.9 | 25.1 | 51.6 | 50.7 | 64.2 | 52.0 | 85.9 | 60.4 | 59.7 | 60.4 | 63.3 | 42.2 | 41.3 | 73.5 |
| 810 | 57.2 | 39.2 | 34.6 | 30.7 | 50.6 | 53.0 | 63.0 | 54.8 | 88.1 | 52.7 | 62.1 | 52.0 | 55.3 | 46.8 | 29.1 | 69.3 |
| 811 | 58.1 | 33.8 | 39.6 | 45.4 | 56.3 | 59.9 | 62.9 | 53.3 | 80.3 | 50.4 | 65.6 | 68.6 | 57.2 | 38.9 | 44.3 | 57.8 |
| 812 | 59.4 | 35.9 | 41.9 | 30.1 | 61.2 | 54.9 | 63.6 | 59.9 | 84.0 | 68.3 | 50.2 | 61.7 | 66.6 | 48.6 | 42.3 | 54.1 |
| 813 | 62.6 | 33.2 | 35.1 | 38.8 | 53.9 | 53.7 | 51.6 | 50.2 | 87.4 | 63.5 | 62.3 | 57.2 | 61.9 | 45.7 | 27.8 | 52.4 |
| 814 | 66.7 | 45.1 | 44.5 | 42.8 | 55.0 | 58.6 | 58.6 | 51.9 | 84.7 | 59.7 | 53.9 | 56.3 | 51.4 | 47.5 | 42.8 | 61.3 |
| 815 | 59.5 | 40.7 | 34.8 | 33.7 | 51.7 | 59.8 | 50.6 | 51.8 | 80.9 | 53.7 | 56.5 | 60.2 | 58.4 | 44.0 | 26.2 | 57.3 |
| 816 | 62.3 | 30.9 | 43.7 | 47.6 | 57.3 | 59.0 | 56.5 | 64.6 | 84.1 | 56.9 | 54.0 | 55.4 | 61.8 | 38.3 | 31.5 | 53.5 |
| 817 | 74.1 | 46.7 | 39.6 | 30.2 | 54.6 | 55.9 | 51.0 | 60.7 | 82.7 | 55.5 | 60.4 | 62.9 | 61.6 | 31.6 | 40.5 | 59.0 |
| 818 | 64.9 | 48.1 | 44.7 | 45.8 | 61.1 | 60.1 | 51.7 | 55.5 | 87.9 | 63.5 | 56.7 | 59.1 | 51.8 | 28.1 | 27.9 | 60.8 |
| 819 | 79.3 | 43.8 | 33.0 | 46.2 | 54.0 | 62.5 | 59.9 | 56.9 | 81.2 | 59.6 | 51.3 | 61.8 | 52.0 | 31.3 | 37.0 | 58.2 |
| 820 | 57.9 | 40.3 | 49.0 | 29.6 | 60.7 | 54.3 | 64.4 | 51.9 | 87.6 | 59.9 | 59.6 | 62.4 | 63.3 | 29.6 | 28.9 | 57.3 |
| 821 | 53.0 | 47.9 | 44.7 | 42.8 | 64.2 | 55.7 | 55.8 | 63.9 | 83.0 | 62.2 | 63.2 | 57.8 | 58.4 | 39.9 | 29.9 | 64.2 |
| 822 | 62.8 | 44.3 | 28.6 | 48.8 | 50.4 | 56.7 | 53.3 | 61.9 | 89.0 | 53.3 | 60.6 | 53.0 | 62.9 | 43.8 | 27.8 | 64.8 |
| 823 | 54.9 | 28.6 | 47.5 | 26.1 | 64.2 | 52.5 | 56.7 | 50.1 | 88.2 | 60.4 | 55.0 | 54.5 | 64.5 | 26.9 | 37.9 | 50.6 |
| 824 | 64.9 | 39.9 | 32.8 | 49.3 | 64.8 | 58.8 | 52.7 | 63.1 | 80.5 | 55.0 | 58.8 | 60.0 | 63.7 | 46.9 | 43.7 | 59.8 |
| 825 | 58.8 | 32.3 | 46.3 | 28.6 | 53.4 | 58.3 | 52.1 | 57.4 | 80.8 | 58.9 | 56.9 | 51.2 | 62.4 | 46.9 | 46.8 | 65.1 |

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | peak loads for cycle # | | | | | | | | |
| 826 | 58.4 | 34.4 | 25.2 | 38.4 | 59.4 | 54.1 | 56.2 | 51.6 | 86.8 | 58.1 | 64.9 | 50.4 | 62.6 | 41.0 | 25.9 | 58.2 |
| 827 | 54.9 | 40.4 | 47.0 | 36.4 | 59.2 | 54.3 | 50.4 | 63.8 | 89.6 | 58.4 | 58.3 | 53.9 | 54.3 | 44.7 | 30.6 | 72.9 |
| 828 | 65.5 | 47.4 | 48.1 | 47.5 | 61.7 | 57.5 | 62.9 | 62.8 | 89.8 | 56.6 | 55.0 | 57.5 | 51.3 | 47.4 | 30.2 | 59.9 |
| 829 | 58.0 | 35.7 | 32.0 | 49.1 | 56.0 | 56.0 | 60.4 | 57.1 | 87.1 | 57.3 | 52.9 | 56.4 | 56.0 | 49.1 | 29.8 | 77.6 |
| 830 | 55.8 | 47.8 | 32.6 | 41.4 | 51.9 | 54.8 | 57.9 | 60.6 | 86.3 | 58.8 | 56.0 | 57.6 | 61.9 | 25.9 | 41.4 | 62.4 |
| 831 | 61.0 | 43.0 | 26.2 | 39.6 | 61.7 | 64.1 | 56.7 | 58.7 | 89.2 | 59.4 | 54.7 | 58.7 | 50.1 | 25.8 | 44.8 | 80.0 |
| 832 | 75.7 | 45.4 | 26.4 | 46.1 | 60.0 | 57.9 | 55.6 | 62.4 | 81.2 | 61.4 | 60.8 | 59.7 | 52.6 | 42.7 | 46.9 | 71.9 |
| 833 | 72.1 | 39.0 | 48.5 | 34.3 | 52.3 | 60.7 | 56.5 | 57.1 | 83.4 | 61.6 | 54.8 | 58.2 | 64.4 | 32.4 | 27.8 | 68.2 |
| 834 | 51.3 | 37.2 | 32.2 | 45.7 | 58.4 | 55.3 | 63.8 | 55.6 | 82.6 | 53.0 | 64.7 | 60.4 | 56.5 | 25.4 | 25.4 | 50.2 |
| 835 | 75.6 | 46.3 | 34.8 | 48.6 | 61.3 | 53.0 | 56.8 | 63.1 | 84.9 | 58.8 | 64.2 | 64.5 | 56.3 | 30.9 | 29.4 | 52.0 |
| 836 | 70.5 | 34.9 | 47.1 | 40.6 | 58.2 | 54.3 | 53.9 | 62.0 | 85.6 | 60.3 | 57.5 | 58.4 | 61.8 | 39.4 | 38.7 | 77.2 |
| 837 | 75.0 | 47.2 | 31.9 | 39.2 | 63.9 | 59.4 | 57.4 | 52.5 | 80.4 | 55.6 | 58.9 | 62.1 | 54.5 | 38.0 | 48.1 | 72.2 |
| 838 | 65.0 | 31.0 | 48.5 | 25.9 | 51.2 | 51.9 | 53.5 | 61.8 | 84.9 | 59.2 | 51.1 | 50.8 | 63.9 | 36.4 | 31.4 | 52.1 |
| 839 | 76.3 | 42.7 | 47.2 | 29.1 | 61.9 | 58.1 | 53.1 | 56.0 | 83.3 | 64.2 | 64.4 | 55.3 | 56.5 | 40.9 | 48.8 | 65.1 |
| 840 | 61.0 | 40.5 | 44.6 | 40.8 | 59.5 | 51.6 | 63.6 | 56.3 | 89.4 | 59.0 | 59.5 | 64.8 | 55.7 | 36.3 | 33.5 | 76.6 |
| 841 | 68.2 | 44.1 | 41.2 | 38.9 | 54.4 | 56.1 | 59.5 | 54.8 | 82.6 | 52.0 | 56.7 | 62.6 | 52.9 | 44.3 | 48.9 | 71.8 |
| 842 | 53.0 | 38.2 | 30.4 | 37.9 | 59.0 | 55.1 | 52.5 | 53.2 | 86.3 | 58.6 | 57.9 | 58.0 | 57.4 | 29.1 | 31.7 | 51.5 |
| 843 | 63.8 | 27.8 | 26.4 | 36.7 | 63.4 | 55.9 | 54.9 | 59.3 | 81.6 | 53.7 | 64.5 | 64.1 | 52.6 | 27.0 | 31.6 | 56.5 |
| 844 | 62.8 | 42.3 | 43.7 | 45.9 | 56.2 | 59.3 | 53.2 | 52.0 | 85.9 | 57.5 | 52.3 | 50.0 | 58.7 | 44.7 | 26.5 | 66.9 |
| 845 | 56.5 | 34.2 | 38.8 | 40.4 | 51.4 | 58.1 | 55.4 | 59.9 | 82.1 | 55.7 | 50.5 | 54.0 | 53.6 | 48.3 | 26.7 | 78.9 |
| 846 | 68.7 | 38.1 | 45.4 | 46.2 | 61.8 | 62.1 | 63.2 | 58.6 | 81.6 | 57.5 | 61.5 | 52.5 | 61.0 | 36.6 | 49.3 | 57.5 |
| 847 | 70.4 | 44.7 | 46.1 | 33.7 | 53.8 | 55.6 | 62.2 | 52.3 | 88.3 | 58.8 | 62.4 | 57.9 | 58.4 | 49.3 | 48.3 | 61.7 |
| 848 | 69.7 | 49.6 | 39.1 | 33.4 | 61.4 | 59.4 | 61.0 | 50.9 | 84.8 | 55.8 | 60.2 | 57.0 | 58.5 | 31.0 | 49.7 | 74.0 |
| 849 | 52.8 | 36.6 | 27.1 | 34.8 | 53.7 | 58.1 | 56.4 | 55.0 | 85.5 | 58.5 | 64.4 | 61.6 | 59.1 | 41.8 | 31.8 | 53.8 |
| 850 | 77.3 | 25.4 | 42.3 | 25.5 | 64.5 | 58.7 | 60.1 | 60.0 | 82.3 | 53.9 | 62.7 | 51.3 | 57.4 | 25.3 | 33.8 | 60.5 |
| 851 | 74.8 | 27.7 | 44.4 | 27.0 | 62.4 | 50.7 | 50.9 | 50.6 | 89.4 | 63.6 | 58.6 | 54.9 | 53.8 | 42.6 | 47.0 | 51.1 |
| 852 | 72.1 | 45.7 | 30.4 | 36.7 | 56.3 | 53.8 | 55.2 | 59.2 | 86.9 | 57.5 | 63.2 | 57.4 | 58.1 | 31.7 | 28.5 | 79.3 |
| 853 | 75.0 | 28.0 | 46.7 | 36.3 | 53.4 | 51.4 | 64.0 | 62.7 | 81.7 | 54.1 | 63.7 | 54.8 | 52.6 | 47.6 | 36.2 | 73.4 |
| 854 | 64.4 | 25.8 | 46.3 | 27.8 | 60.9 | 57.6 | 64.4 | 51.5 | 85.2 | 61.0 | 59.2 | 55.7 | 52.7 | 31.0 | 26.0 | 51.7 |
| 855 | 76.1 | 47.7 | 48.0 | 48.4 | 55.3 | 51.8 | 56.3 | 62.4 | 87.7 | 53.1 | 54.6 | 54.3 | 51.1 | 27.5 | 31.2 | 63.1 |
| 856 | 55.5 | 50.0 | 28.1 | 45.4 | 62.8 | 52.8 | 62.0 | 56.5 | 81.3 | 50.3 | 60.4 | 60.3 | 51.1 | 27.7 | 40.0 | 66.6 |
| 857 | 53.8 | 38.1 | 46.1 | 27.8 | 60.5 | 53.8 | 54.7 | 54.9 | 88.4 | 55.3 | 64.8 | 53.9 | 57.1 | 42.9 | 27.2 | 77.4 |
| 858 | 75.7 | 26.8 | 43.7 | 48.6 | 53.9 | 57.1 | 58.9 | 57.0 | 87.8 | 63.4 | 58.9 | 52.5 | 57.4 | 28.5 | 44.9 | 79.3 |
| 859 | 76.7 | 29.1 | 42.5 | 34.0 | 64.5 | 56.1 | 63.6 | 57.0 | 83.4 | 61.4 | 52.7 | 57.8 | 60.8 | 38.3 | 39.0 | 54.2 |
| 860 | 50.9 | 41.8 | 39.1 | 29.8 | 50.6 | 54.7 | 53.8 | 61.8 | 89.6 | 57.4 | 61.5 | 57.0 | 54.5 | 44.6 | 33.9 | 68.3 |
| 861 | 72.1 | 31.2 | 38.7 | 28.3 | 58.8 | 59.6 | 52.6 | 53.7 | 88.4 | 61.1 | 53.7 | 50.6 | 60.7 | 41.8 | 44.6 | 52.8 |
| 862 | 78.2 | 32.7 | 36.1 | 36.6 | 56.0 | 59.7 | 59.0 | 58.5 | 87.5 | 63.1 | 54.8 | 50.9 | 61.5 | 39.7 | 36.3 | 69.9 |
| 863 | 68.3 | 31.3 | 37.7 | 33.1 | 60.4 | 51.2 | 58.7 | 53.2 | 83.7 | 52.5 | 50.1 | 58.3 | 58.6 | 46.6 | 27.8 | 58.8 |
| 864 | 53.5 | 26.2 | 27.9 | 47.0 | 59.8 | 60.3 | 52.6 | 64.9 | 83.8 | 63.2 | 64.3 | 63.2 | 56.7 | 26.8 | 28.0 | 73.4 |
| 865 | 51.1 | 30.2 | 30.7 | 29.0 | 50.2 | 61.6 | 51.4 | 60.7 | 81.1 | 54.4 | 54.0 | 55.8 | 58.7 | 31.3 | 35.3 | 61.7 |
| 866 | 58.0 | 46.9 | 40.6 | 36.1 | 50.2 | 63.4 | 58.7 | 52.1 | 89.1 | 51.6 | 64.6 | 58.1 | 55.3 | 36.8 | 34.9 | 79.7 |
| 867 | 74.9 | 32.5 | 48.3 | 28.3 | 52.5 | 59.8 | 59.5 | 55.6 | 88.2 | 58.6 | 57.3 | 62.2 | 51.4 | 49.7 | 30.2 | 63.6 |
| 868 | 68.9 | 37.1 | 48.2 | 41.6 | 61.1 | 54.9 | 52.3 | 54.1 | 86.1 | 52.4 | 58.1 | 59.5 | 63.3 | 41.8 | 33.1 | 71.4 |
| 869 | 50.6 | 43.9 | 45.3 | 36.2 | 52.3 | 62.6 | 60.3 | 58.9 | 85.9 | 51.1 | 53.2 | 57.9 | 63.1 | 27.6 | 47.9 | 56.8 |
| 870 | 57.8 | 37.5 | 46.8 | 37.5 | 64.1 | 54.1 | 52.9 | 55.6 | 88.1 | 63.9 | 51.7 | 55.7 | 64.2 | 33.9 | 29.0 | 71.3 |
| 871 | 58.1 | 48.3 | 35.9 | 47.9 | 54.0 | 63.8 | 61.7 | 63.1 | 86.1 | 64.[illegible] | [illegible] | 54.2 | 54.9 | 48.2 | 34.3 | 55.1 |
| 872 | 64.8 | 43.1 | 27.4 | 37.7 | 62.0 | 55.4 | 63.1 | 63.8 | 80.9 | 63.9 | 58.9 | 57.6 | 53.5 | 32.1 | 30.0 | 50.8 |
| 873 | 50.2 | 27.6 | 39.0 | 29.7 | 59.8 | 62.6 | 64.1 | 58.3 | 82.9 | 64.8 | 56.4 | 60.5 | 61.6 | 46.6 | 36.8 | 59.0 |
| 874 | 72.2 | 46.0 | 25.6 | 48.3 | 62.4 | 59.0 | 61.2 | 51.4 | 81.4 | 53.9 | 64.8 | 58.1 | 51.5 | 45.4 | 45.1 | 75.0 |
| 875 | 66.8 | 33.0 | 47.9 | 42.8 | 62.8 | 60.0 | 51.0 | 58.0 | 81.9 | 57.3 | 57.1 | 50.8 | 52.2 | 31.8 | 35.8 | 67.4 |
| 876 | 60.7 | 41.9 | 37.9 | 42.8 | 63.7 | 63.9 | 52.3 | 61.2 | 83.5 | 57.3 | 57.2 | 58.3 | 50.3 | 29.7 | 34.6 | 57.3 |
| 877 | 56.7 | 25.3 | 32.5 | 40.0 | 50.6 | 50.1 | 56.0 | 63.8 | 86.1 | 57.5 | 58.5 | 54.3 | 59.7 | 38.1 | 33.3 | 65.7 |
| 878 | 79.0 | 27.9 | 33.5 | 31.2 | 60.8 | 50.2 | 63.2 | 64.9 | 82.7 | 64.5 | 57.8 | 63.2 | 52.7 | 39.1 | 32.0 | 75.2 |
| 879 | 66.1 | 26.5 | 47.6 | 37.3 | 52.9 | 58.1 | 56.7 | 59.1 | 83.7 | 54.6 | 55.3 | 54.3 | 51.6 | 39.6 | 36.2 | 61.6 |
| 880 | 50.3 | 32.2 | 43.2 | 36.6 | 53.0 | 64.9 | 54.7 | 50.8 | 85.0 | 59.4 | 54.4 | 55.3 | 57.9 | 43.4 | 26.2 | 61.5 |
| 881 | 52.7 | 29.4 | 46.6 | 46.6 | 63.2 | 58.9 | 62.6 | 51.8 | 80.7 | 53.8 | 59.8 | 59.9 | 53.5 | 27.3 | 43.2 | 72.9 |
| 882 | 54.8 | 25.8 | 46.7 | 43.3 | 52.9 | 50.7 | 55.3 | 56.2 | 86.3 | 56.4 | 63.9 | 53.9 | 59.3 | 25.5 | 38.1 | 68.8 |
| 883 | 56.9 | 46.3 | 43.3 | 34.0 | 52.7 | 53.9 | 58.1 | 58.8 | 80.3 | 59.0 | 56.0 | 56.9 | 61.2 | 48.7 | 39.0 | 63.2 |
| 884 | 63.9 | 26.0 | 41.5 | 42.7 | 62.8 | 60.6 | 62.4 | 56.2 | 83.0 | 58.7 | 63.2 | 57.3 | 61.5 | 32.4 | 34.7 | 66.6 |
| 885 | 76.1 | 39.8 | 27.4 | 46.6 | 52.6 | 51.8 | 52.2 | 60.5 | 86.8 | 63.0 | 60.2 | 50.8 | 62.2 | 30.2 | 42.7 | 73.1 |
| 886 | 60.3 | 28.9 | 27.8 | 33.6 | 54.9 | 54.0 | 55.9 | 59.8 | 86.6 | 56.1 | 58.0 | 60.8 | 64.4 | 43.9 | 36.7 | 66.4 |
| 887 | 74.2 | 43.0 | 25.9 | 40.1 | 53.4 | 58.8 | 57.2 | 51.2 | 83.7 | 60.0 | 64.4 | 64.1 | 58.6 | 35.8 | 45.3 | 53.3 |
| 888 | 64.1 | 40.0 | 38.4 | 29.2 | 61.5 | 63.3 | 51.4 | 63.4 | 84.2 | 56.1 | 51.9 | 52.9 | 50.8 | 49.8 | 37.7 | 75.4 |
| 889 | 68.6 | 28.1 | 33.1 | 43.3 | 64.0 | 53.9 | 61.7 | 56.5 | 85.1 | 60.3 | 64.9 | 52.5 | 63.7 | 43.3 | 46.0 | 52.4 |
| 890 | 72.6 | 32.1 | 26.8 | 49.9 | 52.5 | 51.7 | 53.9 | 59.8 | 80.6 | 60.4 | 63.9 | 55.5 | 60.6 | 44.2 | 39.6 | 54.3 |
| 891 | 70.4 | 29.3 | 38.5 | 40.3 | 50.1 | 54.8 | 52.2 | 55.1 | 85.1 | 60.5 | 64.4 | 61.5 | 50.7 | 28.6 | 42.3 | 69.3 |
| 892 | 53.2 | 37.4 | 32.0 | 41.6 | 54.6 | 57.6 | 52.1 | 50.8 | 81.5 | 51.4 | 59.8 | 50.3 | 53.7 | 37.9 | 32.4 | 57.3 |
| 893 | 65.1 | 38.5 | 28.6 | 27.3 | 61.3 | 61.5 | 58.6 | 53.2 | 88.1 | 53.5 | 60.2 | 59.9 | 52.8 | 25.2 | 41.2 | 77.1 |
| 894 | 73.1 | 26.2 | 36.9 | 30.3 | 63.5 | 56.2 | 53.2 | 61.7 | 84.6 | 58.9 | 59.6 | 61.3 | 51.6 | 48.0 | 32.8 | 67.7 |
| 895 | 62.8 | 32.3 | 32.3 | 42.6 | 52.2 | 65.0 | 63.3 | 58.4 | 83.9 | 54.1 | 50.2 | 53.4 | 55.3 | 40.6 | 47.9 | 78.2 |
| 896 | 53.7 | 35.4 | 32.0 | 38.1 | 55.3 | 58.9 | 63.5 | 59.2 | 87.7 | 51.7 | 61.2 | 51.6 | 53.1 | 28.0 | 45.4 | 79.8 |
| 897 | 79.0 | 34.5 | 44.3 | 44.6 | 57.5 | 55.8 | 52.2 | 50.4 | 85.2 | 53.7 | 60.0 | 63.3 | 51.5 | 46.9 | 34.9 | 58.4 |
| 898 | 79.7 | 27.1 | 35.6 | 33.4 | 50.9 | 57.2 | 53.2 | 63.8 | 88.2 | 58.3 | 57.3 | 59.9 | 51.3 | 46.8 | 26.9 | 72.6 |
| 899 | 50.2 | 48.8 | 26.0 | 26.1 | 54.3 | 50.7 | 60.5 | 61.2 | 81.0 | 61.6 | 62.3 | 51.8 | 55.3 | 38.9 | 39.9 | 52.9 |
| 900 | 67.8 | 48.0 | 33.2 | 39.7 | 50.7 | 54.7 | 56.0 | 57.5 | 84.4 | 56.4 | 60.3 | 63.4 | 50.1 | 30.7 | 49.2 | 52.3 |

peak loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 901 | 52.0 | 45.2 | 27.0 | 25.7 | 64.4 | 58.4 | 59.5 | 58.0 | 80.6 | 59.6 | 61.2 | 51.4 | 52.7 | 32.1 | 38.3 | 53.8 |
| 902 | 74.7 | 39.6 | 27.5 | 30.6 | 50.4 | 55.4 | 60.4 | 50.6 | 89.1 | 64.9 | 64.7 | 55.0 | 62.1 | 42.7 | 26.6 | 78.0 |
| 903 | 62.6 | 32.6 | 38.4 | 45.5 | 56.1 | 64.7 | 58.0 | 55.1 | 87.5 | 51.7 | 59.9 | 61.4 | 57.0 | 44.7 | 40.0 | 72.0 |
| 904 | 61.6 | 37.4 | 35.2 | 37.1 | 51.1 | 54.6 | 53.8 | 56.2 | 85.2 | 60.2 | 56.5 | 57.7 | 54.2 | 34.1 | 47.2 | 51.4 |
| 905 | 76.7 | 40.8 | 44.2 | 35.4 | 63.6 | 54.0 | 56.8 | 51.6 | 86.6 | 50.7 | 61.7 | 57.8 | 64.6 | 48.8 | 46.4 | 54.6 |
| 906 | 67.6 | 44.3 | 27.1 | 34.6 | 54.8 | 51.2 | 51.1 | 54.0 | 86.5 | 60.5 | 54.3 | 61.4 | 61.0 | 38.6 | 38.2 | 66.2 |
| 907 | 62.6 | 33.8 | 31.4 | 39.4 | 62.3 | 55.0 | 54.2 | 51.2 | 86.3 | 56.6 | 64.2 | 62.1 | 54.7 | 40.2 | 26.6 | 58.2 |
| 908 | 58.2 | 39.1 | 49.6 | 33.7 | 64.9 | 54.2 | 51.0 | 56.1 | 88.2 | 58.6 | 55.2 | 61.7 | 56.6 | 44.2 | 43.8 | 74.4 |
| 909 | 62.4 | 26.7 | 47.2 | 36.7 | 53.1 | 54.9 | 63.1 | 51.4 | 89.1 | 62.2 | 54.2 | 50.2 | 64.0 | 40.9 | 42.5 | 57.9 |
| 910 | 62.2 | 42.6 | 36.4 | 41.1 | 59.1 | 54.2 | 57.0 | 56.9 | 87.7 | 57.9 | 62.8 | 54.8 | 63.4 | 46.9 | 40.0 | 63.6 |
| 911 | 54.6 | 32.0 | 28.4 | 36.1 | 53.2 | 52.9 | 63.1 | 60.1 | 87.2 | 59.8 | 55.8 | 62.2 | 63.5 | 33.5 | 30.9 | 74.5 |
| 912 | 60.3 | 48.3 | 27.5 | 31.1 | 61.1 | 64.1 | 64.5 | 59.6 | 87.3 | 61.1 | 55.6 | 54.8 | 58.5 | 40.6 | 44.0 | 50.7 |
| 913 | 72.8 | 47.1 | 34.9 | 32.4 | 58.1 | 63.2 | 51.6 | 59.5 | 87.7 | 62.0 | 50.8 | 56.5 | 61.0 | 44.8 | 33.2 | 69.9 |
| 914 | 69.7 | 30.0 | 40.2 | 46.0 | 61.0 | 53.6 | 57.1 | 59.9 | 85.7 | 50.5 | 64.0 | 57.8 | 53.6 | 42.8 | 35.2 | 78.5 |
| 915 | 61.1 | 47.6 | 40.0 | 25.1 | 63.2 | 57.2 | 56.2 | 64.5 | 88.9 | 61.2 | 54.4 | 52.8 | 56.6 | 32.3 | 45.2 | 73.3 |
| 916 | 52.7 | 32.5 | 44.5 | 44.9 | 62.2 | 64.5 | 53.4 | 59.5 | 86.4 | 58.1 | 53.7 | 54.9 | 61.3 | 25.9 | 25.6 | 50.0 |
| 917 | 68.5 | 41.6 | 35.6 | 42.2 | 59.7 | 63.7 | 61.1 | 58.7 | 86.7 | 63.4 | 56.7 | 53.1 | 52.1 | 46.5 | 31.5 | 65.2 |
| 918 | 77.3 | 47.0 | 25.4 | 30.2 | 50.2 | 55.1 | 56.9 | 53.1 | 89.2 | 55.1 | 59.4 | 55.7 | 55.7 | 28.2 | 45.4 | 62.8 |
| 919 | 63.2 | 30.7 | 25.6 | 32.6 | 59.4 | 58.1 | 57.2 | 52.9 | 88.1 | 57.4 | 52.1 | 50.1 | 54.9 | 48.4 | 40.8 | 63.5 |
| 920 | 67.0 | 31.0 | 26.1 | 46.2 | 62.8 | 60.2 | 54.4 | 60.7 | 89.5 | 63.0 | 59.8 | 55.6 | 52.6 | 46.8 | 25.8 | 67.7 |
| 921 | 56.3 | 36.4 | 43.7 | 29.6 | 62.7 | 56.8 | 64.1 | 58.4 | 85.3 | 63.8 | 61.9 | 53.3 | 63.2 | 37.2 | 26.9 | 59.6 |
| 922 | 57.7 | 47.5 | 26.0 | 38.7 | 54.4 | 53.8 | 64.5 | 54.6 | 86.5 | 50.2 | 51.2 | 62.4 | 53.4 | 32.9 | 45.2 | 61.9 |
| 923 | 68.1 | 26.4 | 31.2 | 46.9 | 57.9 | 61.8 | 61.9 | 64.5 | 89.5 | 58.3 | 62.0 | 53.9 | 63.9 | 31.8 | 27.6 | 65.0 |
| 924 | 67.4 | 34.4 | 44.2 | 37.5 | 50.5 | 56.8 | 54.0 | 53.0 | 86.2 | 63.5 | 50.5 | 51.7 | 61.0 | 30.8 | 33.9 | 68.2 |
| 925 | 66.6 | 33.9 | 48.4 | 39.5 | 54.7 | 59.2 | 60.2 | 52.7 | 88.3 | 63.2 | 60.5 | 64.6 | 53.5 | 41.6 | 31.9 | 58.4 |
| 926 | 52.1 | 35.1 | 25.3 | 27.2 | 50.2 | 54.8 | 52.7 | 63.7 | 87.1 | 54.1 | 52.3 | 63.8 | 64.8 | 32.2 | 49.5 | 60.0 |
| 927 | 72.8 | 33.7 | 48.5 | 26.0 | 52.0 | 52.6 | 63.5 | 51.0 | 87.4 | 56.3 | 57.7 | 50.1 | 56.0 | 38.1 | 39.4 | 68.7 |
| 928 | 73.1 | 39.8 | 42.2 | 40.4 | 53.0 | 55.7 | 52.1 | 64.6 | 88.4 | 64.7 | 62.8 | 56.2 | 59.2 | 26.5 | 44.4 | 79.1 |
| 929 | 59.9 | 39.9 | 26.9 | 45.1 | 61.6 | 56.4 | 61.9 | 53.8 | 88.6 | 59.6 | 56.5 | 63.5 | 55.4 | 38.8 | 37.1 | 75.8 |
| 930 | 59.5 | 42.5 | 30.4 | 44.2 | 54.9 | 54.3 | 56.5 | 57.4 | 85.6 | 58.0 | 60.8 | 60.4 | 59.2 | 25.8 | 35.4 | 70.3 |
| 931 | 65.4 | 29.7 | 44.8 | 34.1 | 61.0 | 60.5 | 64.2 | 63.1 | 87.2 | 52.1 | 52.8 | 50.6 | 59.6 | 39.9 | 32.8 | 63.6 |
| 932 | 59.7 | 48.3 | 48.6 | 36.2 | 64.0 | 64.7 | 60.2 | 62.9 | 87.3 | 60.1 | 54.8 | 58.5 | 51.7 | 32.8 | 47.4 | 58.3 |
| 933 | 70.5 | 41.3 | 44.1 | 46.3 | 63.5 | 51.5 | 57.4 | 61.8 | 86.9 | 54.1 | 61.2 | 56.2 | 58.7 | 31.1 | 46.1 | 59.6 |
| 934 | 57.7 | 33.2 | 41.2 | 28.7 | 62.1 | 60.6 | 62.7 | 62.4 | 87.2 | 60.4 | 58.0 | 60.6 | 63.7 | 45.9 | 49.6 | 68.0 |
| 935 | 51.1 | 38.6 | 43.6 | 42.5 | 59.7 | 57.0 | 53.5 | 59.2 | 87.9 | 55.3 | 56.9 | 56.9 | 51.4 | 28.1 | 42.3 | 74.3 |
| 936 | 68.3 | 32.1 | 42.8 | 47.0 | 56.0 | 51.6 | 50.5 | 56.9 | 86.3 | 58.7 | 50.1 | 60.1 | 61.7 | 41.1 | 37.5 | 71.7 |
| 937 | 69.8 | 37.4 | 36.8 | 42.6 | 57.7 | 64.2 | 56.2 | 64.3 | 86.5 | 55.3 | 64.8 | 60.9 | 56.5 | 26.8 | 29.9 | 60.8 |
| 938 | 73.7 | 33.5 | 41.7 | 38.0 | 60.2 | 63.6 | 63.2 | 64.7 | 85.0 | 62.4 | 50.9 | 61.3 | 54.2 | 33.3 | 25.1 | 75.9 |
| 939 | 71.5 | 35.1 | 37.2 | 33.5 | 60.1 | 51.9 | 51.8 | 54.0 | 89.1 | 59.6 | 60.0 | 52.0 | 60.5 | 44.9 | 47.2 | 67.2 |
| 940 | 53.2 | 35.7 | 31.6 | 37.1 | 53.9 | 61.0 | 57.0 | 64.8 | 89.5 | 58.1 | 51.3 | 51.5 | 55.7 | 31.2 | 33.8 | 69.0 |
| 941 | 75.5 | 45.3 | 46.9 | 43.7 | 56.9 | 63.4 | 61.1 | 54.9 | 88.7 | 63.1 | 53.7 | 61.7 | 60.6 | 30.4 | 46.0 | 65.7 |
| 942 | 51.8 | 31.4 | 42.0 | 39.2 | 59.9 | 64.1 | 62.3 | 52.8 | 85.3 | 63.2 | 59.7 | 63.1 | 53.7 | 43.2 | 25.6 | 70.2 |
| 943 | 65.6 | 31.1 | 38.4 | 42.4 | 63.9 | 52.6 | 62.2 | 53.6 | 90.0 | 50.1 | 61.6 | 53.9 | 51.2 | 35.9 | 30.7 | 69.1 |
| 944 | 54.3 | 26.9 | 41.9 | 35.7 | 61.7 | 62.6 | 56.8 | 52.8 | 89.0 | 59.6 | 60.1 | 55.9 | 50.2 | 39.8 | 26.7 | 60.6 |
| 945 | 68.6 | 35.3 | 47.1 | 38.4 | 58.9 | 58.7 | 52.8 | 50.3 | 88.9 | 54.5 | 55.7 | 50.2 | 62.8 | 29.2 | 49.7 | 72.6 |
| 946 | 69.0 | 48.0 | 26.2 | 34.7 | 60.5 | 57.9 | 56.6 | 64.3 | 89.9 | 55.1 | 56.2 | 51.2 | 57.2 | 43.0 | 35.3 | 63.5 |
| 947 | 75.3 | 49.5 | 28.6 | 31.4 | 50.4 | 53.9 | 61.9 | 55.5 | 87.4 | 56.0 | 54.5 | 61.0 | 50.3 | 33.0 | 29.6 | 66.2 |
| 948 | 54.8 | 27.2 | 47.4 | 43.0 | 51.0 | 56.7 | 58.2 | 54.4 | 88.1 | 51.2 | 57.2 | 55.2 | 64.7 | 35.9 | 25.8 | 79.5 |
| 949 | 72.3 | 25.2 | 47.5 | 35.4 | 55.2 | 54.8 | 56.7 | 64.2 | 88.8 | 58.5 | 54.5 | 64.9 | 64.3 | 43.7 | 43.1 | 75.8 |
| 950 | 75.9 | 30.1 | 34.4 | 26.3 | 51.2 | 53.2 | 59.9 | 62.0 | 89.1 | 55.1 | 59.1 | 52.2 | 51.9 | 41.1 | 44.8 | 74.0 |
| 951 | 75.0 | 48.6 | 39.3 | 43.5 | 62.9 | 60.5 | 57.3 | 61.1 | 87.7 | 54.2 | 54.2 | 54.3 | 62.9 | 49.8 | 41.7 | 71.2 |
| 952 | 68.3 | 48.7 | 33.2 | 31.6 | 59.2 | 59.3 | 50.9 | 55.5 | 87.8 | 61.6 | 61.3 | 53.3 | 61.9 | 44.2 | 35.9 | 62.9 |
| 953 | 74.7 | 31.0 | 26.3 | 41.8 | 60.7 | 53.2 | 50.3 | 61.6 | 88.9 | 63.5 | 63.3 | 57.8 | 62.2 | 44.3 | 26.8 | 65.8 |
| 954 | 79.4 | 28.4 | 34.0 | 41.1 | 55.9 | 55.9 | 57.2 | 64.4 | 88.6 | 51.1 | 52.8 | 61.7 | 58.7 | 28.1 | 35.6 | 71.2 |
| 955 | 72.1 | 45.0 | 31.6 | 41.2 | 55.8 | 63.9 | 61.8 | 53.2 | 88.9 | 62.9 | 63.3 | 57.9 | 51.8 | 41.6 | 29.5 | 71.6 |
| 956 | 68.9 | 32.7 | 28.2 | 37.7 | 63.1 | 57.2 | 56.0 | 60.3 | 87.1 | 59.1 | 64.5 | 60.1 | 58.5 | 41.8 | 43.5 | 70.7 |
| 957 | 70.3 | 39.3 | 39.0 | 29.0 | 51.1 | 57.5 | 54.2 | 59.8 | 85.6 | 51.9 | 52.9 | 56.4 | 61.6 | 43.9 | 28.7 | 69.3 |
| 958 | 67.7 | 32.0 | 35.2 | 34.8 | 56.6 | 56.0 | 54.2 | 51.2 | 85.4 | 62.0 | 54.1 | 63.8 | 64.1 | 27.7 | 27.5 | 68.2 |
| 959 | 65.1 | 29.1 | 36.6 | 38.8 | 57.0 | 58.6 | 56.1 | 56.5 | 87.7 | 58.0 | 55.6 | 64.1 | 52.8 | 38.7 | 42.7 | 66.3 |
| 960 | 74.2 | 44.2 | 30.3 | 37.5 | 50.8 | 50.6 | 53.5 | 56.2 | 85.6 | 56.0 | 51.7 | 55.1 | 63.5 | 27.4 | 34.2 | 77.7 |
| 961 | 73.7 | 25.5 | 37.2 | 29.4 | 54.2 | 51.0 | 57.2 | 58.4 | 89.0 | 60.4 | 51.5 | 53.2 | 59.2 | 42.4 | 48.4 | 67.4 |
| 962 | 78.5 | 30.6 | 39.4 | 43.8 | 52.0 | 57.9 | 57.7 | 55.9 | 89.3 | 61.6 | 61.5 | 61.9 | 55.9 | 39.4 | 41.1 | 64.4 |
| 963 | 74.0 | 28.8 | 28.9 | 33.7 | 58.3 | 56.0 | 53.3 | 53.9 | 89.2 | 58.7 | 61.8 | 53.2 | 62.3 | 41.8 | 41.8 | 68.5 |
| 964 | 77.1 | 44.0 | 35.2 | 28.4 | 56.5 | 55.3 | 57.2 | 59.8 | 85.9 | 53.0 | 58.2 | 50.7 | 56.1 | 30.7 | 46.1 | 68.4 |
| 965 | 70.2 | 33.2 | 26.6 | 27.0 | 60.0 | 52.9 | 55.8 | 53.2 | 89.7 | 53.8 | 55.7 | 52.0 | 54.7 | 32.9 | 25.5 | 76.3 |
| 966 | 72.0 | 42.4 | 39.3 | 31.9 | 57.2 | 55.8 | 56.5 | 51.2 | 88.3 | 51.9 | 52.8 | 54.4 | 61.5 | 32.8 | 37.8 | 76.2 |
| 967 | 70.6 | 43.3 | 32.5 | 37.0 | 53.1 | 54.8 | 51.4 | 56.1 | 87.8 | 58.7 | 58.3 | 59.2 | 50.1 | 42.3 | 43.6 | 69.4 |
| 968 | 73.5 | 26.5 | 43.1 | 29.8 | 57.9 | 58.9 | 57.3 | 58.7 | 87.9 | 50.4 | 62.2 | 52.0 | 52.3 | 25.8 | 44.3 | 66.8 |
| 969 | 76.7 | 42.1 | 26.9 | 30.1 | 57.6 | 55.9 | 59.1 | 56.6 | 89.6 | 50.6 | 56.6 | 59.2 | 55.3 | 47.7 | 40.2 | 60.4 |
| 970 | 73.2 | 43.6 | 41.1 | 32.9 | 51.7 | 53.9 | 55.1 | 53.0 | 89.9 | 57.5 | 64.8 | 62.8 | 55.2 | 49.3 | 31.7 | 77.4 |
| 971 | 71.9 | 34.5 | 39.6 | 34.1 | 58.8 | 56.7 | 50.7 | 54.2 | 86.7 | 58.4 | 50.2 | 56.9 | 63.4 | 29.5 | 45.5 | 64.0 |
| 972 | 72.1 | 25.4 | 31.2 | 33.5 | 53.3 | 53.7 | 59.7 | 51.9 | 88.8 | 61.6 | 50.0 | 52.8 | 63.8 | 30.5 | 39.9 | 73.9 |
| 973 | 75.2 | 34.4 | 40.9 | 44.1 | 57.8 | 56.8 | 56.9 | 53.3 | 85.2 | 53.0 | 59.9 | 53.1 | 58.0 | 32.6 | 42.4 | 64.6 |
| 974 | 78.4 | 37.5 | 34.5 | 40.4 | 53.6 | 58.2 | 52.1 | 60.0 | 88.5 | 55.7 | 54.0 | 52.9 | 50.8 | 45.2 | 34.8 | 60.2 |
| 975 | 78.9 | 42.0 | 36.4 | 44.5 | 52.7 | 51.3 | 55.1 | 52.6 | 86.2 | 56.8 | 58.4 | 54.0 | 58.3 | 27.8 | 43.2 | 78.3 |

peak loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 976 | 75.3 | 34.3 | 40.8 | 26.9 | 52.3 | 59.2 | 57.1 | 59.4 | 85.5 | 57.5 | 51.1 | 53.4 | 55.5 | 44.1 | 44.9 | 79.6 |
| 977 | 71.3 | 28.4 | 25.3 | 37.7 | 55.3 | 57.0 | 55.9 | 57.2 | 85.7 | 50.9 | 52.5 | 55.3 | 55.0 | 33.3 | 35.3 | 71.8 |
| 978 | 70.1 | 35.7 | 36.0 | 26.1 | 55.4 | 57.8 | 58.3 | 57.2 | 87.4 | 56.1 | 53.3 | 59.3 | 59.4 | 31.7 | 43.1 | 76.7 |
| 979 | 76.3 | 35.4 | 38.9 | 28.1 | 50.9 | 55.1 | 55.4 | 58.9 | 87.3 | 54.0 | 59.7 | 51.9 | 52.5 | 49.1 | 28.5 | 78.3 |
| 980 | 79.1 | 35.7 | 35.5 | 28.3 | 52.8 | 54.3 | 55.6 | 54.8 | 88.6 | 56.0 | 53.0 | 52.8 | 53.5 | 36.7 | 31.3 | 64.5 |
| 981 | 76.6 | 42.8 | 32.7 | 26.9 | 53.5 | 56.3 | 50.0 | 51.1 | 86.2 | 57.4 | 53.7 | 50.2 | 57.8 | 36.3 | 45.6 | 63.7 |
| 982 | 77.1 | 36.2 | 36.8 | 37.2 | 58.8 | 51.2 | 54.8 | 50.1 | 87.1 | 58.4 | 58.7 | 53.0 | 53.4 | 25.6 | 38.1 | 63.7 |
| 983 | 78.8 | 38.1 | 26.2 | 29.8 | 51.4 | 54.1 | 56.6 | 55.3 | 85.2 | 50.7 | 50.5 | 51.9 | 53.9 | 42.2 | 25.4 | 72.4 |
| 984 | 77.4 | 42.8 | 30.2 | 25.6 | 50.6 | 53.5 | 52.1 | 53.3 | 88.0 | 51.6 | 53.8 | 53.3 | 55.5 | 44.1 | 26.3 | 64.1 |
| 985 | 76.4 | 41.5 | 40.6 | 40.2 | 52.6 | 54.9 | 54.8 | 54.4 | 88.6 | 50.9 | 52.3 | 51.5 | 59.2 | 38.5 | 43.5 | 63.5 |
| 986 | 75.1 | 44.5 | 36.5 | 35.4 | 54.5 | 54.4 | 54.4 | 50.3 | 85.2 | 55.4 | 54.3 | 54.3 | 50.9 | 33.7 | 38.7 | 61.0 |
| 987 | 77.7 | 37.7 | 33.5 | 41.5 | 51.4 | 51.4 | 53.6 | 50.4 | 89.3 | 58.2 | 55.7 | 55.1 | 55.2 | 28.8 | 33.7 | 72.7 |
| 988 | 77.1 | 26.3 | 33.3 | 34.1 | 52.1 | 51.6 | 53.3 | 52.8 | 86.2 | 54.0 | 52.3 | 50.2 | 51.9 | 44.0 | 30.5 | 65.0 |
| 989 | 77.7 | 30.7 | 30.1 | 37.5 | 53.8 | 53.5 | 53.6 | 51.3 | 85.3 | 52.0 | 53.5 | 54.8 | 55.7 | 38.7 | 44.6 | 63.3 |
| 990 | 76.6 | 25.4 | 42.2 | 36.6 | 53.4 | 54.0 | 50.3 | 54.6 | 88.9 | 50.9 | 53.4 | 54.2 | 52.1 | 44.2 | 29.7 | 61.1 |
| 991 | 78.3 | 41.0 | 33.6 | 33.9 | 50.7 | 51.0 | 53.2 | 53.9 | 85.4 | 53.6 | 51.6 | 51.8 | 54.4 | 37.2 | 27.2 | 63.2 |
| 992 | 78.8 | 34.8 | 33.5 | 34.7 | 51.8 | 53.4 | 54.7 | 54.2 | 90.0 | 53.9 | 54.4 | 54.2 | 53.9 | 43.3 | 43.1 | 60.9 |
| 993 | 79.4 | 31.3 | 41.1 | 41.7 | 52.5 | 53.7 | 50.3 | 54.7 | 88.4 | 53.3 | 50.3 | 54.8 | 50.1 | 41.4 | 26.3 | 72.7 |
| 994 | 75.2 | 42.7 | 44.9 | 42.3 | 52.3 | 51.4 | 52.6 | 54.0 | 87.4 | 50.2 | 51.5 | 53.2 | 51.8 | 26.8 | 42.3 | 77.1 |
| 995 | 77.6 | 44.6 | 40.1 | 43.2 | 54.6 | 54.4 | 50.7 | 53.2 | 88.5 | 51.8 | 51.2 | 52.6 | 52.4 | 43.9 | 43.2 | 71.5 |
| 996 | 75.2 | 44.5 | 44.8 | 45.0 | 53.4 | 52.5 | 50.6 | 50.1 | 86.6 | 53.6 | 51.0 | 52.7 | 50.0 | 44.5 | 29.8 | 79.9 |
| 997 | 78.2 | 43.3 | 42.6 | 43.8 | 54.7 | 52.5 | 52.2 | 50.7 | 89.1 | 54.5 | 50.4 | 51.0 | 52.5 | 40.2 | 42.4 | 71.2 |
| 998 | 78.2 | 41.0 | 40.4 | 42.5 | 52.4 | 50.8 | 52.5 | 54.2 | 89.9 | 54.9 | 53.0 | 50.6 | 51.4 | 41.8 | 44.2 | 73.1 |
| 999 | 75.2 | 42.1 | 43.6 | 43.1 | 51.7 | 51.0 | 50.6 | 52.5 | 88.9 | 52.0 | 53.9 | 52.9 | 53.0 | 40.5 | 40.3 | 73.1 |
| 1000 | 76.6 | 42.9 | 43.4 | 44.2 | 52.7 | 52.6 | 51.9 | 52.8 | 89.7 | 50.8 | 53.9 | 52.9 | 53.7 | 40.8 | 40.1 | 72.3 |

Figure C-3. Table of Valley Loads for Advanced Fighter Spectrum

| mission | valley loads for cycle # 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.6 | 13.5 | 14.3 | 3.4 | 13.7 | 16.1 | 7.2 | 11.0 | -21.0 | 4.0 | 7.9 | 3.2 | 14.8 | 7.1 | 19.7 | 0.4 |
| 2 | -4.3 | 20.[illegible] | 19.6 | 20.6 | 20.0 | 2.6 | 4.3 | 4.1 | -6.4 | 16.3 | 10.3 | 23.6 | 3.2 | 4.5 | 18.7 | -4.2 |
| 3 | -7.2 | 2.2 | 3.0 | 9.8 | 16.8 | 18.9 | 19.2 | 22.2 | -27.1 | 14.7 | 7.4 | 22.0 | 18.1 | 5.5 | 18.4 | -9.3 |
| 4 | -1.3 | 2.8 | 22.0 | 11.8 | 12.7 | 10.3 | 21.1 | 20.5 | -21.4 | 22.7 | 17.7 | 1.0 | 14.9 | 9.9 | 16.5 | -3.3 |
| 5 | 4.6 | 18.9 | 0.1 | 17.5 | 0.8 | 16.8 | 23.9 | 2.4 | -11.3 | 16.1 | 1.7 | 4.0 | 2.9 | 21.0 | 18.6 | -3.4 |
| 6 | -2.9 | 22.4 | 3.9 | 0.3 | 22.7 | 17.0 | 12.8 | 3.3 | -18.0 | 17.8 | 13.5 | 23.8 | 9.5 | 16.7 | 15.1 | -5.5 |
| 7 | -3.9 | 4.7 | 19.3 | 24.0 | 7.6 | 23.9 | 21.0 | 22.3 | -18.6 | 18.1 | 2.5 | 9.7 | 19.2 | 19.0 | 7.4 | -9.6 |
| 8 | 3.6 | 22.7 | 3.1 | 0.5 | 11.3 | 5.3 | 6.3 | 5.9 | -17.1 | 20.4 | 14.8 | 0.8 | 12.7 | 15.2 | 9.7 | 0.0 |
| 9 | -3.1 | 18.8 | 9.9 | 23.0 | 5.3 | 3.8 | 2.4 | 5.4 | -29.0 | 11.1 | 19.7 | 8.6 | 5.8 | 2.2 | 0.7 | -1.0 |
| 10 | -2.6 | 16.2 | 18.1 | 23.3 | 15.9 | 7.4 | 20.6 | 9.5 | -0.1 | 5.3 | 11.5 | 24.8 | 13.7 | 7.8 | 24.9 | 3.3 |
| 11 | 3.8 | 14.2 | 6.9 | 4.9 | 13.2 | 19.8 | 1.4 | 2.8 | -7.7 | 16.6 | 10.9 | 4.2 | 14.9 | 10.3 | 19.3 | -1.8 |
| 12 | 0.2 | 8.5 | 7.7 | 0.9 | 0.1 | 5.3 | 16.1 | 22.9 | -26.8 | 3.0 | 16.8 | 22.5 | 15.4 | 9.1 | 14.7 | 3.5 |
| 13 | -4.7 | 11.8 | 5.7 | 6.5 | 1.6 | 9.7 | 18.4 | 18.6 | -7.5 | 11.8 | 7.3 | 9.0 | 12.6 | 20.0 | 12.7 | 2.9 |
| 14 | 0.2 | 23.6 | 16.4 | 12.1 | 3.6 | 5.2 | 20.5 | 7.6 | -3.2 | 0.0 | 16.9 | 4.6 | 9.5 | 20.6 | 12.1 | -6.2 |
| 15 | -7.9 | 1.1 | 12.3 | 11.0 | 17.1 | 11.0 | 20.3 | 9.4 | -8.5 | 4.8 | 12.6 | 19.4 | 3.6 | 20.4 | 10.1 | -7.9 |
| 16 | -2.3 | 4.0 | 24.2 | 7.3 | 17.4 | 13.2 | 2.7 | 2.9 | -1.0 | 13.7 | 20.9 | 15.8 | 1.2 | 6.1 | 4.6 | -8.2 |
| 17 | -3.2 | 15.0 | 18.2 | 23.3 | 7.6 | 10.7 | 16.1 | 9.5 | -12.5 | 9.7 | 3.9 | 16.0 | 6.2 | 12.4 | 20.0 | -0.7 |
| 18 | -9.9 | 10.3 | 21.7 | 8.1 | 8.5 | 10.0 | 24.0 | 0.8 | -15.9 | 17.6 | 18.5 | 7.8 | 0.2 | 19.8 | 6.5 | 3.9 |
| 19 | 4.5 | 12.0 | 1.7 | 21.5 | 11.0 | 12.3 | 10.7 | 2.7 | -1.1 | 4.2 | 0.7 | 1.1 | 6.0 | 18.6 | 21.1 | 4.4 |
| 20 | -0.3 | 24.3 | 0.4 | 20.3 | 12.2 | 11.4 | 14.6 | 10.6 | -16.4 | 15.0 | 24.7 | 2.8 | 17.4 | 9.7 | 18.4 | 1.9 |
| 21 | 3.1 | 11.6 | 0.9 | 0.1 | 5.4 | 16.2 | 24.8 | 6.5 | -6.5 | 15.9 | 19.2 | 25.0 | 20.0 | 14.5 | 21.2 | 4.9 |
| 22 | -5.6 | 18.2 | 7.4 | 0.1 | 14.0 | 9.1 | 16.3 | 1.8 | -22.0 | 17.9 | 21.4 | 17.3 | 2.2 | 13.7 | 8.4 | 2.0 |
| 23 | -2.0 | 17.1 | 3.7 | 7.2 | 19.0 | 13.5 | 21.0 | 12.2 | -4.3 | 13.8 | 8.8 | 21.1 | 6.2 | 0.3 | 5.6 | 0.3 |
| 24 | -2.3 | 17.1 | 20.8 | 22.4 | 5.4 | 6.5 | 11.9 | 20.1 | -15.8 | 11.9 | 13.3 | 15.0 | 4.6 | 12.3 | 24.5 | -6.9 |
| 25 | -2.4 | 21.2 | 1.2 | 6.8 | 14.9 | 1.5 | 17.8 | 19.2 | -6.5 | 17.9 | 10.1 | 10.0 | 1.9 | 15.7 | 2.0 | 1.8 |
| 26 | -6.6 | 9.0 | 12.7 | 1.5 | 21.6 | 6.4 | 12.1 | 10.5 | -14.7 | 18.5 | 7.1 | 19.8 | 11.0 | 12.0 | 13.9 | -2.2 |
| 27 | 2.5 | 19.5 | 12.8 | 22.7 | 8.8 | 6.2 | 1.8 | 22.4 | -20.5 | 13.6 | 8.6 | 5.9 | 4.9 | 21.5 | 14.4 | -9.6 |
| 28 | -9.3 | 9.4 | 12.6 | 7.5 | 20.7 | 20.6 | 16.7 | 5.5 | -1.9 | 24.4 | 4.6 | 23.5 | 18.1 | 15.7 | 24.9 | -6.9 |
| 29 | -7.2 | 10.2 | 15.6 | 9.1 | 13.9 | 12.3 | 23.3 | 3.8 | -19.7 | 1.3 | 9.7 | 16.2 | 23.5 | 0.4 | 23.1 | -8.2 |
| 30 | -6.3 | 11.8 | 7.4 | 16.7 | 9.1 | 19.6 | 14.0 | 24.4 | -13.2 | 6.4 | 2.3 | 11.6 | 8.3 | 23.1 | 7.1 | 1.0 |
| 31 | 4.1 | 19.4 | 19.1 | 1.3 | 17.0 | 14.0 | 21.1 | 7.8 | -1.2 | 21.8 | 13.7 | 16.6 | 1.5 | 6.3 | 9.4 | 1.6 |
| 32 | 1.7 | 12.3 | 16.6 | 10.9 | 16.0 | 8.2 | 5.8 | 23.7 | -21.8 | 6.8 | 16.9 | 12.8 | 24.6 | 5.0 | 11.1 | -2.0 |
| 33 | -8.2 | 0.9 | 14.9 | 15.5 | 2.6 | 14.1 | 22.6 | 15.7 | -15.4 | 6.1 | 16.0 | 1.4 | 18.5 | 14.7 | 5.8 | 0.1 |
| 34 | -6.1 | 9.8 | 17.0 | 2.9 | 18.9 | 0.1 | 7.9 | 22.0 | -24.9 | 7.8 | 9.9 | 24.1 | 20.2 | 3.9 | 13.8 | -9.4 |
| 35 | -3.4 | 11.0 | 2.5 | 23.6 | 3.4 | 24.5 | 19.2 | 20.8 | -20.6 | 0.5 | 6.6 | 8.0 | 14.3 | 22.5 | 21.0 | -2.7 |
| 36 | 4.7 | 5.9 | 17.7 | 11.4 | 18.2 | 17.8 | 24.5 | 0.1 | -14.3 | 7.0 | 12.5 | 11.0 | 9.3 | 8.9 | 18.2 | 0.1 |
| 37 | -5.9 | 9.0 | 13.6 | 3.5 | 0.0 | 16.1 | 15.8 | 3.6 | -2.3 | 8.3 | 19.1 | 12.0 | 11.0 | 14.6 | 5.7 | 2.8 |
| 38 | 3.2 | 15.9 | 5.4 | 21.7 | 17.4 | 13.2 | 3.5 | 23.7 | -3.8 | 4.6 | 21.4 | 21.9 | 6.1 | 23.3 | 7.7 | -0.6 |
| 39 | -6.4 | 23.3 | 17.2 | 2.5 | 19.7 | 14.9 | 13.2 | 14.5 | -21.7 | 17.2 | 18.0 | 14.6 | 18.3 | 17.5 | 9.3 | -2.6 |
| 40 | 5.0 | 17.7 | 0.2 | 1.8 | 0.2 | 19.0 | 11.8 | 21.5 | -9.6 | 13.3 | 15.8 | 23.1 | 8.9 | 20.1 | 17.0 | -2.1 |
| 41 | -5.2 | 24.5 | 15.4 | 18.4 | 0.8 | 17.7 | 6.1 | 22.2 | -17.7 | 9.8 | 9.5 | 7.8 | 9.8 | 9.0 | 22.6 | -1.1 |
| 42 | 0.7 | 1.0 | 10.7 | 19.0 | 12.7 | 9.5 | 1.8 | 17.4 | -1.5 | 16.6 | 5.4 | 10.3 | 21.6 | 14.6 | 4.4 | 0.9 |
| 43 | -1.7 | 15.4 | 15.5 | 17.5 | 21.8 | 8.9 | 6.0 | 10.0 | -15.9 | 4.4 | 20.8 | 4.8 | 14.8 | 9.8 | 19.4 | -0.4 |
| 44 | -7.6 | 19.1 | 14.2 | 18.9 | 15.2 | 0.6 | 23.4 | 2.2 | -3.9 | 20.6 | 16.5 | 24.0 | 19.9 | 4.7 | 2.5 | 2.5 |
| 45 | -3.7 | 10.5 | 3.2 | 15.3 | 1.8 | 2.4 | 22.5 | 8.2 | -8.6 | 2.3 | 10.8 | 3.1 | 0.6 | 22.3 | 17.7 | 3.7 |
| 46 | -2.2 | 16.4 | 15.9 | 5.2 | 8.6 | 21.6 | 23.1 | 3.1 | -10.9 | 8.3 | 14.2 | 14.5 | 20.9 | 14.0 | 20.7 | 4.6 |
| 47 | -1.4 | 3.2 | 13.0 | 14.6 | 20.0 | 12.1 | 14.7 | 11.3 | -8.2 | 20.6 | 12.6 | 20.4 | 16.8 | 4.9 | 10.0 | -2.6 |
| 48 | -5.4 | 18.2 | 14.8 | 18.3 | 17.5 | 15.1 | 10.0 | 0.7 | -1.4 | 16.6 | 8.4 | 14.3 | 19.5 | 21.7 | 2.1 | -1.7 |
| 49 | 2.2 | 3.1 | 13.4 | 4.7 | 24.7 | 17.4 | 12.8 | 24.8 | -2.6 | 15.6 | 19.2 | 5.5 | 22.1 | 10.7 | 23.1 | 0.9 |
| 50 | -5.7 | 11.3 | 6.1 | 4.6 | 4.0 | 2.4 | 0.1 | 24.5 | -11.9 | 14.2 | 20.7 | 22.8 | 20.8 | 9.3 | 5.7 | 0.4 |
| 51 | 0.8 | 2.8 | 22.6 | 21.0 | 19.6 | 1.8 | 17.3 | 11.5 | -19.9 | 21.8 | 16.6 | 24.8 | 7.3 | 5.6 | 18.8 | 2.0 |
| 52 | 3.8 | 12.2 | 24.4 | 7.8 | 4.5 | 15.7 | 2.0 | 0.9 | -10.7 | 20.1 | 4.3 | 15.7 | 10.1 | 14.0 | 17.1 | 3.4 |
| 53 | -8.3 | 11.7 | 19.0 | 8.4 | 2.1 | 16.9 | 21.2 | 18.5 | -18.6 | 1.5 | 20.3 | 8.5 | 13.3 | 5.6 | 24.6 | -8.1 |
| 54 | 0.2 | 14.5 | 23.2 | 18.5 | 10.4 | 1.5 | 19.6 | 1.3 | -0.3 | 17.4 | 23.6 | 8.5 | 22.7 | 6.6 | 19.2 | -2.4 |
| 55 | -3.0 | 9.0 | 0.7 | 10.8 | 20.4 | 24.2 | 2.1 | 12.2 | -5.1 | 12.7 | 10.2 | 23.2 | 21.4 | 23.7 | 0.2 | 1.0 |
| 56 | -5.7 | 8.5 | 21.6 | 3.0 | 8.0 | 0.4 | 10.1 | 19.9 | -15.7 | 6.2 | 16.6 | 15.6 | 16.9 | 1.2 | 15.7 | -4.8 |
| 57 | -7.8 | 12.2 | 23.3 | 12.6 | 2.7 | 17.9 | 21.7 | 16.0 | -14.9 | 11.1 | 14.2 | 0.9 | 23.9 | 15.7 | 21.7 | 4.7 |
| 58 | -4.1 | 17.3 | 5.9 | 7.8 | 7.2 | 20.8 | 5.5 | 3.0 | -11.6 | 6.9 | 19.9 | 23.2 | 2.1 | 14.0 | 24.0 | -9.5 |
| 59 | -3.4 | 1.2 | 5.7 | 3.2 | 18.6 | 14.7 | 12.5 | 7.5 | -16.2 | 21.0 | 9.9 | 11.4 | 23.2 | 15.2 | 23.8 | 2.1 |
| 60 | -2.7 | 7.5 | 8.7 | 22.6 | 1.9 | 7.0 | 0.5 | 9.8 | -5.3 | 3.1 | 7.5 | 0.5 | 1.1 | 2.2 | 24.6 | -6.1 |
| 61 | 0.8 | 22.7 | 17.5 | 15.2 | 22.4 | 10.0 | 9.9 | 20.7 | -9.6 | 5.0 | 3.6 | 22.8 | 20.0 | 1.3 | 4.7 | -9.7 |
| 62 | 1.0 | 0.4 | 14.7 | 14.9 | 20.2 | 8.3 | 12.9 | 7.2 | -18.6 | 15.7 | 11.2 | 21.9 | 19.4 | 17.1 | 17.2 | -9.0 |
| 63 | 3.6 | 21.1 | 14.2 | 14.3 | 3.1 | 24.5 | 7.4 | 10.3 | -18.9 | 16.6 | 9.4 | 2.6 | 8.8 | 3.6 | 14.3 | -2.7 |
| 64 | -10.0 | 3.8 | 20.9 | 6.9 | 0.3 | 18.4 | 12.3 | 4.2 | -6.1 | 13.0 | 16.9 | 11.8 | 17.6 | 1.6 | 10.7 | -5.1 |
| 65 | -9.6 | 12.4 | 13.3 | 11.6 | 10.0 | 14.7 | 23.5 | 3.8 | -2.8 | 18.1 | 23.1 | 5.5 | 0.4 | 12.9 | 24.9 | -2.2 |
| 66 | 2.0 | 19.4 | 5.9 | 14.2 | 4.4 | 19.7 | 10.4 | 8.1 | -14.8 | 9.4 | 13.9 | 16.3 | 1.3 | 8.9 | 19.1 | -5.8 |
| 67 | -2.1 | 23.4 | 21.8 | 24.9 | 16.9 | 8.3 | 17.8 | 21.1 | -18.6 | 17.0 | 23.6 | 8.3 | 8.8 | 12.9 | 8.2 | -9.1 |
| 68 | -0.3 | 6.6 | 9.2 | 20.3 | 16.5 | 24.7 | 13.9 | 16.0 | -14.5 | 7.7 | 7.2 | 6.1 | 3.5 | 6.0 | 4.5 | 2.1 |
| 69 | -7.4 | 9.6 | 7.3 | 0.5 | 13.7 | 16.3 | 14.5 | 23.6 | -17.7 | 12.8 | 12.8 | 0.2 | 20.5 | 11.0 | 17.2 | -6.9 |
| 70 | -3.7 | 1.0 | 22.9 | 9.4 | 17.9 | 0.4 | 2.1 | 1.6 | -5.4 | 24.6 | 19.0 | 9.0 | 3.4 | 19.8 | 8.7 | 1.6 |
| 71 | 2.1 | 20.4 | 6.8 | 23.4 | 3.9 | 11.0 | 13.1 | 19.8 | -16.1 | 16.5 | 11.8 | 12.1 | 17.9 | 13.7 | 21.0 | -7.7 |
| 72 | -4.1 | 23.9 | 5.6 | 8.7 | 0.8 | 19.2 | 14.1 | 18.2 | -17.6 | 13.5 | 11.1 | 8.3 | 16.4 | 8.7 | 2.2 | -2.9 |
| 73 | -2.9 | 4.3 | 12.9 | 4.3 | 6.2 | 3.5 | 3.8 | 14.8 | -6.7 | 12.4 | 22.1 | 22.7 | 1.3 | 0.9 | 8.0 | -0.6 |
| 74 | -6.2 | 11.3 | 20.9 | 5.0 | 0.2 | 20.3 | 14.3 | 13.0 | -6.3 | 14.0 | 19.2 | 15.6 | 24.0 | 20.1 | 21.4 | 1.7 |
| 75 | -3.8 | 14.4 | 8.5 | 9.4 | 3.5 | 20.6 | 9.0 | 12.6 | -11.1 | 9.6 | 8.6 | 10.5 | 12.7 | 17.4 | 2.9 | 1.0 |

valley loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76 | -5.5 | 14.4 | 13.6 | 3.0 | 24.3 | 17.3 | 3.9 | 2.0 | -12.7 | 2.6 | 22.6 | 0.5 | 2.3 | 23.8 | 8.8 | -6.9 |
| 77 | 6.0 | 12.9 | 23.4 | 13.6 | 5.2 | 5.9 | 5.5 | 10.6 | -17.3 | 7.2 | 18.1 | 16.3 | 17.3 | 12.3 | 13.9 | 4.5 |
| 78 | -0.7 | 11.9 | 11.2 | 13.5 | 10.2 | 9.0 | 17.5 | 1.0 | -19.5 | 1.7 | 14.7 | 19.3 | 12.1 | 24.7 | 18.4 | -9.3 |
| 79 | -7.3 | 17.7 | 11.4 | 18.1 | 24.2 | 0.8 | 2.1 | 17.1 | -10.8 | 11.3 | 22.2 | 6.0 | 7.0 | 22.2 | 23.7 | -0.2 |
| 80 | 4.5 | 11.0 | 1.0 | 20.2 | 10.8 | 21.1 | 10.5 | 7.9 | -11.1 | 5.7 | 9.4 | 13.9 | 10.4 | 11.5 | 9.3 | -4.6 |
| 81 | -1.3 | 3.9 | 4.4 | 8.5 | 22.4 | 15.0 | 12.9 | 3.4 | -10.5 | 16.7 | 17.2 | 9.1 | 24.2 | 11.1 | 24.0 | 1.5 |
| 82 | -8.8 | 11.2 | 8.1 | 1.3 | 3.8 | 19.4 | 8.5 | 24.6 | -13.0 | 13.2 | 6.1 | 4.1 | 16.2 | 23.2 | 22.6 | -0.9 |
| 83 | -6.2 | 18.6 | 24.4 | 17.2 | 16.2 | 6.4 | 0.2 | 24.1 | -8.7 | 19.6 | 10.7 | 13.8 | 20.5 | 19.2 | 14.2 | 3.2 |
| 84 | -5.9 | 8.1 | 0.8 | 7.6 | 8.6 | 5.2 | 1.2 | 10.2 | -10.6 | 13.7 | 16.0 | 4.2 | 13.7 | 24.7 | 17.7 | -0.3 |
| 85 | 2.9 | 17.6 | 14.8 | 1.3 | 17.4 | 23.3 | 7.6 | 24.4 | -17.1 | 0.4 | 23.3 | 15.5 | 19.1 | 21.8 | 18.2 | -1.3 |
| 86 | -1.6 | 24.0 | 11.8 | 5.6 | 16.0 | 8.6 | 6.0 | 5.9 | -2.7 | 6.7 | 24.8 | 0.0 | 19.5 | 12.8 | 7.5 | -1.9 |
| 87 | -7.8 | 9.9 | 5.7 | 6.5 | 19.2 | 5.7 | 2.8 | 15.1 | -6.8 | 13.8 | 19.1 | 11.0 | 13.9 | 12.9 | 9.6 | 1.2 |
| 88 | -4.1 | 4.1 | 3.6 | 24.5 | 10.6 | 12.9 | 7.0 | 2.3 | -4.2 | 19.1 | 3.6 | 4.0 | 16.1 | 21.1 | 13.2 | -8.6 |
| 89 | 3.5 | 8.6 | 6.0 | 20.9 | 19.5 | 10.2 | 18.5 | 1.1 | -10.6 | 3.2 | 7.1 | 4.2 | 18.0 | 15.9 | 23.1 | -3.1 |
| 90 | -0.5 | 19.5 | 8.0 | 5.7 | 9.7 | 4.5 | 4.0 | 11.4 | -7.7 | 1.2 | 16.4 | 14.6 | 3.2 | 24.8 | 19.8 | -4.0 |
| 91 | 1.8 | 21.6 | 2.3 | 23.8 | 2.8 | 5.2 | 21.4 | 20.7 | -8.2 | 9.2 | 11.5 | 15.2 | 17.0 | 14.7 | 12.7 | -4.9 |
| 92 | -6.4 | 2.7 | 0.6 | 19.3 | 17.4 | 22.7 | 18.2 | 15.5 | -3.6 | 20.5 | 9.6 | 17.0 | 0.3 | 17.0 | 22.9 | -3.2 |
| 93 | -6.1 | 18.1 | 7.6 | 2.8 | 18.6 | 10.7 | 16.9 | 9.2 | -17.6 | 2.7 | 10.8 | 18.1 | 15.4 | 6.7 | 23.4 | -8.6 |
| 94 | -2.7 | 20.8 | 15.7 | 23.4 | 19.2 | 5.7 | 19.0 | 21.0 | -1.3 | 20.9 | 13.1 | 2.2 | 15.2 | 18.3 | 7.8 | -9.9 |
| 95 | -9.9 | 6.1 | 11.3 | 13.9 | 0.3 | 6.6 | 0.2 | 22.7 | -10.0 | 4.2 | 8.9 | 9.7 | 6.5 | 7.5 | 11.4 | 3.9 |
| 96 | -5.0 | 2.4 | 8.1 | 10.0 | 8.7 | 4.0 | 21.8 | 1.5 | -10.8 | 24.8 | 23.9 | 2.5 | 14.3 | 20.1 | 14.1 | -1.2 |
| 97 | 2.4 | 10.0 | 10.3 | 14.1 | 2.3 | 4.8 | 3.3 | 1.7 | -11.8 | 16.0 | 20.5 | 18.9 | 6.1 | 11.7 | 22.9 | -4.1 |
| 98 | -9.5 | 9.4 | 10.4 | 0.5 | 6.8 | 20.9 | 19.8 | 19.1 | -17.5 | 12.3 | 22.5 | 4.6 | 4.3 | 22.9 | 8.6 | -2.3 |
| 99 | 3.2 | 23.8 | 0.6 | 0.4 | 1.8 | 16.6 | 12.6 | 0.1 | -12.3 | 20.9 | 14.8 | 14.5 | 22.4 | 11.8 | 7.0 | -7.1 |
| 100 | -8.7 | 18.0 | 22.8 | 16.1 | 20.6 | 6.5 | 6.9 | 24.8 | -14.8 | 23.4 | 19.6 | 21.0 | 15.7 | 24.3 | 8.7 | -9.5 |
| 101 | -0.9 | 24.3 | 14.0 | 12.0 | 24.0 | 19.0 | 1.6 | 6.4 | -5.2 | 5.6 | 14.7 | 18.1 | 1.2 | 17.8 | 10.2 | -6.5 |
| 102 | 2.7 | 11.6 | 17.2 | 18.3 | 4.8 | 21.0 | 11.1 | 5.3 | -13.9 | 11.2 | 8.4 | 24.0 | 10.1 | 22.9 | 10.1 | 1.9 |
| 103 | -9.4 | 3.4 | 19.0 | 24.5 | 18.2 | 20.3 | 22.5 | 23.0 | -0.6 | 15.7 | 23.8 | 3.7 | 20.4 | 21.0 | 5.5 | -6.0 |
| 104 | 2.9 | 7.3 | 23.1 | 19.5 | 14.3 | 0.6 | 9.8 | 20.7 | -10.9 | 1.4 | 2.3 | 20.4 | 11.3 | 11.3 | 10.5 | -0.5 |
| 105 | -1.9 | 12.6 | 8.5 | 14.2 | 15.2 | 13.3 | 2.1 | 11.9 | -16.1 | 23.8 | 19.4 | 18.6 | 4.3 | 19.6 | 15.4 | 0.5 |
| 106 | -3.8 | 9.5 | 1.4 | 12.9 | 17.0 | 24.0 | 1.1 | 16.0 | -2.8 | 7.7 | 7.7 | 11.2 | 0.5 | 16.1 | 6.0 | -2.1 |
| 107 | 4.9 | 15.2 | 20.2 | 21.4 | 14.2 | 19.8 | 16.7 | 20.3 | -6.8 | 11.1 | 16.6 | 20.2 | 14.4 | 20.3 | 22.7 | -8.8 |
| 108 | 4.5 | 22.8 | 17.4 | 22.6 | 23.3 | 6.4 | 2.3 | 19.3 | -18.5 | 2.6 | 20.1 | 5.3 | 6.2 | 12.1 | 15.2 | -7.8 |
| 109 | -1.1 | 0.2 | 20.9 | 19.6 | 7.9 | 11.7 | 4.2 | 10.9 | -1.4 | 7.8 | 11.5 | 13.1 | 5.8 | 11.5 | 10.6 | -5.6 |
| 110 | -5.0 | 15.2 | 19.3 | 9.2 | 18.3 | 21.7 | 9.0 | 9.9 | -4.8 | 0.9 | 4.3 | 14.3 | 1.8 | 21.3 | 21.4 | -2.7 |
| 111 | -1.1 | 8.5 | 5.6 | 11.3 | 13.6 | 11.4 | 3.1 | 1.1 | -8.5 | 1.6 | 18.9 | 23.2 | 18.3 | 20.2 | 23.7 | -1.6 |
| 112 | -5.0 | 6.3 | 24.9 | 11.5 | 18.6 | 16.6 | 8.2 | 20.9 | -4.3 | 4.9 | 1.4 | 21.8 | 13.6 | 13.3 | 9.8 | -1.3 |
| 113 | -2.2 | 20.0 | 20.3 | 12.9 | 24.9 | 18.8 | 5.2 | 21.3 | -8.4 | 21.8 | 16.5 | 23.6 | 11.1 | 22.7 | 15.6 | -3.1 |
| 114 | 3.2 | 11.8 | 16.4 | 10.7 | 24.4 | 8.7 | 9.1 | 6.6 | -16.4 | 6.9 | 1.5 | 21.9 | 12.4 | 20.9 | 11.2 | 0.1 |
| 115 | -9.0 | 14.2 | 9.8 | 6.7 | 4.4 | 9.4 | 4.0 | 17.5 | -13.4 | 15.3 | 6.3 | 1.6 | 20.1 | 19.3 | 23.9 | 4.1 |
| 116 | -0.4 | 23.7 | 2.9 | 10.1 | 2.6 | 11.4 | 9.3 | 19.1 | -12.6 | 0.6 | 17.8 | 3.1 | 10.6 | 19.2 | 8.7 | -5.2 |
| 117 | -8.8 | 18.7 | 24.1 | 6.6 | 13.0 | 20.7 | 24.4 | 5.2 | -17.1 | 9.2 | 13.7 | 10.3 | 8.4 | 10.5 | 5.7 | 2.5 |
| 118 | 3.7 | 25.0 | 1.6 | 8.2 | 24.6 | 1.8 | 18.1 | 23.5 | -10.2 | 15.0 | 19.8 | 11.1 | 18.1 | 20.7 | 8.0 | 4.1 |
| 119 | -7.0 | 3.7 | 9.9 | 21.4 | 5.0 | 3.0 | 11.8 | 0.6 | -15.5 | 12.5 | 21.9 | 22.7 | 11.3 | 17.0 | 24.3 | -8.4 |
| 120 | -5.0 | 19.6 | 2.6 | 4.1 | 2.5 | 15.8 | 0.2 | 2.9 | -9.2 | 24.8 | 19.0 | 18.6 | 23.5 | 24.5 | 16.0 | -8.8 |
| 121 | -4.1 | 7.5 | 12.4 | 1.0 | 13.2 | 10.0 | 20.3 | 9.0 | -16.8 | 18.6 | 20.0 | 10.0 | 17.8 | 11.0 | 9.9 | -2.2 |
| 122 | -1.2 | 4.0 | 17.3 | 6.3 | 3.9 | 2.4 | 7.1 | 15.2 | -9.9 | 5.0 | 20.0 | 14.6 | 0.8 | 7.3 | 13.5 | 2.7 |
| 123 | -6.5 | 6.4 | 20.3 | 20.0 | 17.1 | 9.4 | 24.9 | 1.1 | -8.1 | 17.3 | 0.8 | 13.9 | 18.6 | 7.4 | 5.0 | -6.9 |
| 124 | -8.2 | 14.7 | 15.1 | 16.1 | 13.1 | 8.7 | 11.9 | 20.9 | -7.8 | 11.0 | 14.7 | 0.1 | 9.9 | 15.9 | 9.2 | -9.8 |
| 125 | -9.2 | 15.9 | 15.6 | 24.9 | 13.0 | 1.4 | 21.4 | 12.5 | -10.9 | 17.2 | 16.4 | 7.2 | 8.3 | 11.8 | 18.5 | -3.2 |
| 126 | -2.8 | 21.3 | 8.5 | 15.2 | 15.0 | 11.7 | 19.1 | 20.2 | -16.0 | 24.4 | 5.0 | 15.5 | 8.7 | 6.4 | 16.9 | 0.7 |
| 127 | -6.9 | 1.0 | 17.4 | 16.1 | 22.8 | 9.2 | 17.5 | 24.5 | -9.8 | 5.7 | 20.6 | 12.6 | 15.4 | 16.4 | 9.2 | 4.8 |
| 128 | 3.1 | 15.4 | 24.1 | 12.4 | 15.7 | 6.3 | 10.3 | 6.2 | -13.9 | 19.9 | 20.0 | 6.9 | 5.2 | 6.7 | 15.6 | -2.2 |
| 129 | -4.3 | 8.2 | 16.7 | 12.0 | 17.0 | 23.5 | 18.1 | 11.3 | -17.1 | 19.9 | 18.7 | 19.9 | 22.3 | 15.3 | 8.0 | 4.6 |
| 130 | 0.5 | 3.6 | 7.2 | 6.4 | 17.5 | 11.8 | 24.9 | 22.4 | -14.1 | 14.3 | 11.5 | 22.9 | 6.1 | 10.4 | 11.1 | 2.0 |
| 131 | 2.2 | 5.9 | 23.6 | 18.6 | 8.0 | 7.0 | 9.7 | 0.6 | -19.4 | 23.9 | 21.2 | 23.1 | 3.4 | 10.2 | 12.2 | 0.8 |
| 132 | -1.5 | 1.5 | 12.6 | 16.2 | 19.9 | 1.8 | 15.4 | 2.5 | -1.3 | 23.2 | 1.1 | 0.2 | 21.4 | 24.8 | 18.2 | -7.3 |
| 133 | 4.4 | 18.3 | 4.6 | 4.5 | 10.2 | 23.6 | 5.8 | 22.1 | -11.3 | 4.0 | 13.9 | 22.2 | 21.6 | 11.7 | 13.2 | -3.7 |
| 134 | -1.9 | 12.8 | 3.0 | 0.7 | 19.5 | 22.8 | 21.5 | 12.7 | -16.3 | 19.0 | 17.5 | 15.9 | 18.1 | 8.5 | 7.0 | -8.8 |
| 135 | -4.8 | 6.1 | 5.3 | 17.4 | 16.6 | 5.9 | 18.4 | 20.3 | -3.3 | 6.2 | 16.7 | 14.6 | 18.3 | 13.1 | 18.6 | 3.8 |
| 136 | 2.7 | 11.4 | 24.6 | 0.4 | 17.5 | 20.5 | 10.3 | 16.1 | -2.0 | 16.3 | 14.5 | 11.7 | 24.5 | 8.5 | 13.7 | -6.6 |
| 137 | -9.2 | 14.7 | 19.7 | 9.1 | 12.6 | 0.3 | 10.6 | 15.0 | -17.0 | 16.7 | 0.7 | 16.5 | 1.0 | 17.1 | 23.2 | -6.9 |
| 138 | -4.6 | 22.9 | 18.2 | 19.6 | 20.7 | 4.7 | 11.9 | 5.6 | -3.3 | 1.1 | 3.5 | 23.1 | 1.4 | 21.9 | 22.4 | 0.6 |
| 139 | -3.1 | 5.6 | 17.1 | 13.5 | 5.7 | 21.7 | 24.3 | 6.2 | -16.0 | 0.4 | 15.7 | 21.5 | 20.7 | 12.0 | 10.0 | -6.9 |
| 140 | 2.5 | 8.7 | 8.2 | 20.1 | 15.2 | 19.2 | 18.7 | 6.4 | -5.3 | 7.0 | 1.8 | 17.9 | 7.3 | 15.1 | 24.2 | 0.1 |
| 141 | -8.9 | 14.8 | 2.6 | 5.0 | 1.5 | 16.5 | 24.6 | 17.2 | -4.4 | 5.2 | 20.9 | 24.5 | 23.1 | 14.2 | 20.9 | 2.2 |
| 142 | -2.5 | 9.5 | 3.2 | 22.3 | 2.2 | 16.6 | 14.8 | 8.0 | -7.1 | 17.9 | 16.6 | 9.0 | 17.3 | 5.6 | 16.1 | -0.4 |
| 143 | 4.1 | 21.7 | 5.0 | 13.6 | 1.8 | 4.1 | 21.3 | 19.6 | -11.1 | 5.8 | 13.7 | 17.0 | 23.3 | 9.1 | 11.8 | 3.2 |
| 144 | -1.2 | 17.9 | 3.3 | 7.8 | 12.1 | 5.2 | 12.2 | 18.9 | -12.4 | 10.7 | 15.0 | 20.1 | 10.7 | 22.9 | 8.5 | 2.8 |
| 145 | -2.0 | 2.4 | 10.1 | 6.9 | 12.0 | 17.9 | 21.9 | 23.0 | -8.7 | 11.2 | 7.1 | 13.3 | 11.1 | 21.8 | 12.8 | -2.8 |
| 146 | 4.5 | 20.3 | 22.9 | 24.2 | 9.7 | 16.3 | 5.9 | 20.2 | -4.6 | 20.0 | 1.4 | 6.0 | 7.2 | 12.7 | 11.7 | -8.3 |
| 147 | -0.5 | 2.0 | 15.1 | 22.4 | 15.1 | 21.6 | 13.4 | 20.2 | -15.8 | 22.5 | 8.1 | 10.2 | 11.8 | 8.5 | 18.9 | 0.1 |
| 148 | -8.5 | 20.3 | 7.4 | 14.9 | 23.9 | 10.6 | 13.8 | 20.7 | -12.9 | 22.5 | 11.4 | 19.5 | 22.9 | 10.9 | 16.8 | 1.8 |
| 149 | -0.9 | 19.0 | 18.3 | 9.3 | 24.9 | 9.0 | 2.3 | 18.1 | -15.2 | 15.9 | 22.7 | 4.9 | 9.9 | 24.6 | 15.8 | -6.5 |
| 150 | -5.7 | 13.2 | 22.7 | 2.0 | 16.5 | 13.1 | 4.3 | 23.9 | -9.7 | 0.9 | 9.9 | 14.9 | 0.4 | 11.3 | 20.9 | -4.1 |

valley loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 151 | -1.4 | 2.7 | 12.3 | 9.9 | 10.9 | 11.1 | 8.8 | 23.5 | -11.9 | 1.9 | 20.0 | 0.1 | 15.6 | 5.8 | 20.6 | 0.1 |
| 152 | -1.2 | 6.6 | 14.0 | 17.3 | 1.7 | 23.8 | 1.7 | 14.9 | -3.5 | 13.6 | 8.8 | 9.3 | 4.4 | 21.5 | 24.9 | 1.9 |
| 153 | 0.9 | 16.2 | 3.5 | 17.2 | 16.7 | 8.2 | 18.1 | 20.7 | -15.0 | 17.3 | 24.8 | 6.0 | 21.8 | 24.1 | 14.2 | 0.4 |
| 154 | -1.4 | 2.6 | 5.0 | 5.9 | 3.2 | 3.9 | 12.6 | 0.8 | -19.7 | 9.7 | 15.4 | 4.7 | 11.3 | 8.3 | 21.1 | -5.9 |
| 155 | 2.2 | 5.0 | 17.2 | 20.7 | 21.0 | 1.4 | 5.2 | 2.9 | -13.1 | 4.1 | 1.3 | 13.2 | 3.3 | 16.5 | 12.4 | -9.4 |
| 156 | 2.0 | 4.3 | 23.6 | 6.5 | 8.8 | 19.8 | 8.0 | 7.2 | -3.0 | 11.4 | 2.8 | 2.7 | 7.5 | 21.2 | 11.9 | 3.5 |
| 157 | -9.6 | 3.0 | 0.1 | 17.3 | 9.1 | 19.9 | 12.5 | 0.7 | -10.7 | 12.5 | 1.8 | 5.2 | 14.9 | 21.0 | 7.1 | -2.7 |
| 158 | 0.0 | 19.9 | 20.8 | 2.6 | 10.0 | 8.3 | 13.7 | 9.0 | -5.6 | 11.5 | 17.3 | 13.8 | 19.6 | 19.3 | 12.9 | -3.1 |
| 159 | -5.6 | 1.5 | 14.6 | 19.1 | 16.5 | 6.9 | 1.2 | 8.3 | -3.0 | 12.6 | 17.2 | 23.0 | 2.1 | 18.2 | 13.8 | -7.0 |
| 160 | -10.0 | 14.0 | 11.8 | 1.6 | 15.7 | 7.6 | 4.4 | 9.9 | -2.8 | 15.6 | 8.6 | 14.0 | 22.6 | 19.4 | 12.4 | -3.9 |
| 161 | -1.0 | 18.8 | 13.3 | 12.5 | 23.1 | 24.1 | 2.7 | 4.3 | -13.5 | 22.2 | 5.2 | 1.5 | 14.8 | 19.2 | 8.4 | -3.5 |
| 162 | -6.3 | 19.9 | 20.4 | 22.2 | 24.3 | 18.4 | 10.8 | 6.7 | -10.6 | 18.8 | 13.7 | 3.5 | 1.9 | 15.8 | 23.5 | 5.0 |
| 163 | -6.9 | 21.8 | 2.8 | 3.2 | 19.4 | 8.5 | 1.6 | 24.3 | -12.6 | 6.4 | 13.4 | 19.0 | 3.9 | 23.4 | 9.6 | 2.3 |
| 164 | -0.8 | 17.1 | 9.3 | 22.5 | 15.3 | 10.5 | 1.3 | 4.3 | -10.7 | 24.9 | 20.5 | 16.5 | 10.3 | 22.3 | 18.8 | -2.0 |
| 165 | -1.2 | 0.4 | 14.7 | 17.8 | 14.0 | 9.8 | 3.9 | 24.8 | -3.1 | 9.3 | 1.3 | 16.0 | 9.7 | 23.9 | 19.4 | 0.3 |
| 166 | -6.9 | 11.2 | 13.8 | 22.6 | 0.8 | 13.7 | 5.3 | 19.8 | -10.1 | 7.9 | 21.3 | 3.4 | 19.1 | 20.3 | 7.1 | -1.2 |
| 167 | -3.3 | 12.2 | 9.8 | 9.6 | 2.0 | 0.7 | 7.0 | 16.7 | -5.3 | 5.3 | 7.3 | 14.4 | 10.9 | 10.2 | 17.6 | -0.8 |
| 168 | -7.7 | 5.1 | 0.5 | 7.8 | 1.2 | 15.7 | 4.7 | 0.6 | -8.8 | 5.7 | 5.4 | 4.6 | 1.7 | 22.4 | 17.2 | -7.5 |
| 169 | -7.1 | 4.3 | 18.0 | 17.6 | 24.9 | 7.6 | 10.2 | 14.0 | -1.5 | 9.1 | 4.9 | 21.7 | 8.5 | 23.3 | 24.6 | -1.3 |
| 170 | 0.1 | 24.6 | 8.9 | 8.8 | 2.2 | 23.8 | 18.4 | 5.5 | -3.6 | 23.9 | 20.3 | 24.6 | 15.3 | 24.5 | 22.8 | 2.5 |
| 171 | 4.6 | 21.4 | 0.1 | 10.1 | 4.7 | 16.5 | 21.7 | 5.4 | -10.7 | 0.1 | 7.0 | 6.4 | 8.6 | 19.4 | 20.4 | 0.0 |
| 172 | 1.7 | 2.8 | 18.6 | 6.5 | 21.4 | 6.2 | 14.6 | 23.7 | -2.4 | 18.3 | 24.1 | 4.5 | 5.6 | 14.8 | 19.0 | -0.5 |
| 173 | -4.3 | 10.7 | 17.4 | 6.0 | 8.9 | 20.8 | 19.6 | 12.5 | -5.7 | 5.3 | 18.8 | 3.6 | 17.1 | 6.2 | 9.6 | -3.6 |
| 174 | -3.4 | 21.6 | 19.8 | 23.1 | 22.6 | 21.0 | 23.6 | 6.1 | -9.5 | 20.5 | 24.6 | 19.6 | 16.9 | 5.7 | 21.0 | -4.9 |
| 175 | -5.6 | 17.7 | 22.1 | 16.7 | 19.7 | 2.0 | 17.0 | 5.0 | -7.1 | 23.8 | 22.6 | 21.5 | 22.7 | 17.4 | 24.8 | 1.1 |
| 176 | -2.6 | 0.3 | 21.9 | 2.6 | 23.3 | 3.4 | 16.9 | 19.2 | -9.6 | 0.3 | 2.6 | 21.4 | 12.3 | 11.3 | 20.3 | -0.4 |
| 177 | -7.1 | 3.0 | 5.6 | 11.3 | 9.5 | 10.8 | 7.7 | 3.5 | -1.6 | 9.2 | 7.1 | 1.5 | 20.3 | 12.7 | 17.0 | -4.3 |
| 178 | -1.3 | 1.0 | 5.8 | 5.1 | 9.8 | 2.5 | 8.1 | 6.8 | -6.6 | 8.5 | 7.2 | 1.1 | 9.7 | 19.0 | 5.4 | 1.8 |
| 179 | -3.8 | 4.0 | 24.7 | 17.2 | 15.4 | 21.6 | 14.7 | 18.1 | -8.6 | 19.3 | 22.9 | 5.2 | 3.0 | 9.5 | 19.0 | -7.1 |
| 180 | -2.5 | 23.6 | 3.6 | 16.1 | 0.5 | 6.0 | 8.4 | 0.6 | -2.1 | 19.6 | 1.8 | 15.8 | 6.2 | 9.2 | 15.9 | -9.2 |
| 181 | -3.6 | 23.1 | 21.9 | 11.5 | 17.6 | 24.6 | 4.2 | 10.2 | -4.6 | 1.2 | 21.5 | 23.9 | 17.7 | 12.9 | 16.0 | 1.4 |
| 182 | -3.6 | 23.0 | 2.3 | 7.0 | 2.4 | 2.4 | 24.3 | 15.3 | -11.7 | 23.5 | 16.6 | 14.2 | 15.2 | 10.8 | 9.3 | -0.5 |
| 183 | -4.3 | 24.8 | 13.8 | 7.7 | 20.3 | 12.5 | 16.2 | 7.6 | -0.8 | 9.9 | 10.7 | 19.1 | 5.6 | 22.3 | 8.3 | -7.0 |
| 184 | -7.3 | 20.7 | 12.4 | 2.5 | 20.8 | 12.0 | 11.1 | 2.1 | -10.1 | 8.1 | 10.6 | 7.3 | 18.6 | 15.7 | 6.0 | -8.9 |
| 185 | -1.1 | 7.6 | 18.1 | 16.0 | 21.0 | 18.5 | 6.8 | 6.2 | -9.3 | 10.3 | 18.6 | 1.1 | 20.9 | 21.3 | 10.9 | 1.7 |
| 186 | 0.7 | 21.1 | 7.3 | 1.5 | 7.5 | 4.4 | 22.8 | 12.4 | -3.1 | 9.5 | 15.5 | 20.4 | 13.5 | 7.7 | 10.3 | -6.5 |
| 187 | 4.0 | 13.1 | 12.5 | 17.9 | 7.7 | 14.7 | 1.3 | 1.2 | -5.4 | 18.2 | 16.0 | 23.9 | 8.8 | 11.1 | 14.1 | 4.1 |
| 188 | -6.5 | 11.2 | 6.5 | 20.7 | 9.9 | 15.5 | 5.7 | 17.8 | -6.5 | 2.9 | 20.0 | 18.3 | 2.9 | 23.0 | 16.5 | -4.8 |
| 189 | -0.4 | 15.1 | 4.2 | 6.4 | 4.6 | 1.2 | 13.9 | 9.1 | -6.5 | 20.3 | 3.8 | 12.4 | 0.4 | 13.3 | 6.6 | 2.9 |
| 190 | -5.1 | 21.1 | 22.5 | 23.5 | 13.4 | 12.6 | 6.6 | 17.0 | -11.3 | 15.0 | 3.5 | 21.6 | 1.6 | 13.7 | 24.7 | -2.4 |
| 191 | -0.2 | 2.9 | 21.2 | 9.9 | 24.4 | 7.3 | 3.6 | 6.4 | -12.6 | 13.3 | 1.5 | 1.4 | 6.2 | 6.3 | 8.9 | -5.8 |
| 192 | -8.6 | 12.6 | 10.3 | 21.3 | 1.0 | 11.5 | 19.9 | 6.0 | -1.2 | 3.0 | 17.5 | 24.4 | 20.6 | 9.6 | 7.6 | -2.1 |
| 193 | -0.7 | 13.1 | 23.7 | 2.1 | 17.6 | 21.3 | 2.6 | 3.3 | -0.2 | 2.7 | 1.3 | 4.1 | 23.3 | 19.1 | 8.7 | -7.3 |
| 194 | -3.3 | 17.7 | 8.3 | 5.5 | 4.7 | 11.4 | 0.6 | 10.8 | -4.5 | 12.0 | 11.7 | 2.8 | 14.7 | 17.4 | 22.0 | -3.0 |
| 195 | 0.0 | 13.4 | 6.3 | 3.7 | 7.9 | 4.3 | 19.7 | 14.4 | -2.8 | 21.7 | 21.7 | 23.8 | 9.4 | 18.3 | 18.8 | -2.8 |
| 196 | -3.2 | 5.3 | 22.0 | 3.2 | 5.5 | 12.3 | 18.7 | 21.5 | -9.2 | 10.3 | 5.7 | 1.6 | 9.3 | 15.3 | 19.5 | 0.3 |
| 197 | -4.6 | 23.6 | 24.7 | 18.8 | 13.7 | 12.5 | 7.6 | 16.4 | -0.8 | 13.8 | 21.3 | 18.3 | 22.5 | 10.7 | 13.6 | -2.2 |
| 198 | 3.9 | 22.5 | 24.3 | 21.5 | 21.4 | 13.0 | 13.3 | 12.4 | -0.3 | 5.1 | 8.1 | 5.7 | 24.4 | 22.8 | 16.8 | -5.5 |
| 199 | -8.8 | 1.5 | 1.1 | 15.4 | 9.5 | 24.0 | 5.9 | 9.0 | -9.7 | 5.9 | 17.2 | 18.8 | 23.3 | 9.9 | 9.4 | -3.3 |
| 200 | -4.0 | 20.6 | 2.1 | 22.0 | 17.9 | 10.4 | 6.3 | 11.6 | -8.3 | 10.8 | 4.1 | 18.1 | 24.1 | 9.4 | 20.2 | -9.3 |
| 201 | -1.5 | 7.6 | 11.9 | 24.5 | 8.3 | 7.7 | 19.8 | 18.6 | -13.3 | 13.8 | 10.9 | 13.4 | 17.7 | 13.8 | 5.3 | -9.8 |
| 202 | -1.3 | 20.6 | 12.5 | 17.1 | 17.6 | 16.3 | 22.7 | 24.1 | -10.0 | 18.0 | 12.0 | 9.5 | 19.3 | 23.6 | 18.9 | -6.2 |
| 203 | 3.7 | 16.4 | 13.1 | 20.3 | 15.6 | 0.7 | 2.6 | 13.3 | -12.2 | 13.2 | 1.0 | 0.6 | 3.4 | 18.2 | 16.5 | -9.8 |
| 204 | 2.4 | 2.3 | 2.0 | 3.4 | 8.7 | 0.4 | 18.5 | 12.9 | -7.1 | 0.2 | 21.7 | 15.2 | 24.8 | 11.1 | 9.0 | -9.5 |
| 205 | -9.8 | 21.5 | 19.8 | 5.5 | 5.4 | 7.4 | 3.4 | 11.7 | -5.6 | 14.0 | 17.9 | 16.7 | 17.3 | 13.9 | 22.0 | -1.8 |
| 206 | -9.3 | 4.8 | 23.1 | 6.5 | 18.1 | 14.5 | 20.1 | 12.9 | -14.0 | 20.9 | 1.8 | 8.9 | 21.4 | 17.9 | 6.6 | -7.7 |
| 207 | -1.9 | 24.3 | 6.1 | 12.4 | 8.3 | 14.6 | 9.1 | 8.0 | -1.9 | 3.9 | 21.1 | 19.7 | 23.8 | 6.3 | 13.7 | 2.6 |
| 208 | -0.5 | 22.6 | 1.0 | 0.2 | 21.6 | 17.7 | 24.7 | 23.4 | -4.6 | 10.3 | 9.6 | 21.9 | 9.5 | 5.9 | 23.7 | 3.3 |
| 209 | -1.1 | 3.8 | 0.3 | 18.0 | 23.3 | 4.9 | 1.5 | 22.9 | -1.4 | 16.7 | 10.4 | 2.5 | 11.7 | 21.0 | 17.4 | -9.8 |
| 210 | 3.1 | 21.2 | 11.3 | 14.6 | 22.5 | 23.8 | 1.1 | 6.2 | -10.4 | 5.7 | 3.1 | 6.3 | 0.7 | 19.1 | 19.9 | -7.4 |
| 211 | -2.2 | 24.4 | 19.7 | 20.7 | 14.8 | 4.2 | 22.6 | 17.8 | -4.2 | 7.3 | 21.1 | 1.6 | 10.4 | 9.4 | 6.3 | 0.2 |
| 212 | 1.5 | 8.7 | 6.9 | 16.2 | 13.0 | 20.7 | 20.4 | 1.1 | -7.1 | 6.7 | 7.7 | 3.6 | 13.1 | 13.6 | 7.7 | -9.0 |
| 213 | -9.4 | 2.0 | 14.1 | 18.4 | 8.0 | 17.2 | 24.6 | 22.0 | -11.1 | 7.5 | 13.8 | 17.2 | 13.9 | 11.8 | 22.0 | 4.6 |
| 214 | -2.9 | 24.0 | 19.0 | 2.9 | 13.6 | 13.2 | 12.1 | 1.6 | -3.7 | 19.1 | 2.3 | 16.5 | 24.8 | 6.1 | 10.5 | 2.0 |
| 215 | 2.7 | 18.3 | 18.5 | 24.0 | 18.8 | 3.1 | 7.7 | 22.1 | -5.3 | 17.4 | 17.1 | 17.8 | 0.5 | 8.5 | 7.9 | 2.9 |
| 216 | 2.9 | 1.5 | 11.4 | 15.0 | 5.7 | 9.5 | 22.3 | 13.6 | -3.5 | 3.6 | 17.1 | 5.2 | 23.2 | 23.9 | 20.2 | 3.0 |
| 217 | 4.9 | 8.0 | 7.8 | 6.0 | 20.6 | 5.4 | 4.2 | 14.9 | -8.7 | 21.5 | 7.6 | 22.9 | 7.6 | 24.2 | 24.7 | -6.4 |
| 218 | 1.9 | 16.7 | 13.1 | 8.5 | 6.7 | 0.5 | 0.2 | 9.6 | -5.5 | 16.9 | 12.5 | 4.3 | 21.1 | 8.1 | 24.3 | 5.0 |
| 219 | 1.6 | 1.7 | 0.3 | 24.6 | 19.8 | 17.7 | 5.7 | 2.5 | -10.5 | 24.6 | 8.5 | 22.9 | 7.6 | 6.6 | 20.9 | -8.0 |
| 220 | 1.2 | 8.9 | 19.1 | 7.8 | 7.7 | 1.1 | 0.1 | 23.6 | -7.5 | 15.5 | 22.6 | 16.2 | 14.5 | 12.4 | 23.5 | 3.3 |
| 221 | -4.6 | 19.2 | 19.2 | 10.3 | 24.4 | 6.0 | 20.7 | 10.8 | -6.5 | 3.7 | 5.8 | 15.6 | 21.0 | 14.5 | 21.9 | 2.4 |
| 222 | -8.1 | 14.2 | 4.9 | 14.8 | 20.9 | 6.7 | 16.9 | 14.2 | -8.5 | 22.4 | 11.3 | 7.0 | 11.1 | 8.6 | 9.6 | 1.3 |
| 223 | -1.7 | 23.6 | 8.7 | 24.0 | 9.3 | 3.7 | 15.6 | 19.1 | -4.5 | 10.6 | 4.5 | 11.6 | 18.8 | 11.6 | 15.2 | 0.9 |
| 224 | 0.9 | 9.2 | 0.7 | 15.0 | 1.8 | 2.0 | 13.7 | 8.5 | -0.2 | 23.6 | 15.1 | 7.3 | 5.8 | 7.6 | 15.6 | -2.9 |
| 225 | -3.3 | 17.5 | 4.5 | 9.1 | 17.1 | 1.6 | 1.9 | 5.0 | -4.4 | 18.6 | 11.9 | 10.6 | 21.4 | 17.0 | 12.8 | -3.2 |

valley loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 226 | 4.5 | 5.8 | 1.3 | 11.7 | 2.6 | 16.8 | 1.2 | 16.4 | -1.3 | 10.5 | 9.5 | 17.9 | 5.7 | 16.1 | 5.4 | -9.8 |
| 227 | 1.1 | 3.8 | 22.3 | 10.8 | 4.1 | 2.4 | 20.1 | 11.2 | -10.2 | 19.3 | 21.8 | 20.9 | 18.2 | 24.5 | 11.4 | 3.4 |
| 228 | -7.9 | 14.2 | 4.8 | 18.3 | 15.2 | 15.3 | 18.0 | 2.1 | -11.2 | 12.0 | 1.8 | 15.1 | 17.6 | 6.7 | 6.0 | 3.1 |
| 229 | 0.4 | 2.9 | 19.5 | 22.6 | 9.4 | 23.9 | 3.7 | 22.5 | -4.5 | 21.9 | 4.1 | 1.9 | 1.0 | 6.5 | 7.6 | -2.7 |
| 230 | -3.8 | 14.2 | 16.7 | 7.0 | 2.5 | 8.5 | 6.5 | 6.5 | -2.8 | 0.1 | 20.1 | 5.9 | 18.9 | 7.4 | 18.1 | 3.5 |
| 231 | -8.1 | 21.3 | 13.0 | 14.5 | 13.0 | 12.0 | 18.6 | 11.6 | -7.9 | 22.8 | 20.3 | 2.0 | 1.6 | 9.9 | 13.2 | -6.9 |
| 232 | -5.9 | 7.1 | 8.9 | 17.4 | 16.5 | 17.2 | 16.0 | 18.7 | -14.5 | 14.0 | 16.6 | 11.1 | 22.0 | 12.7 | 22.9 | 2.0 |
| 233 | -4.3 | 5.3 | 25.0 | 16.3 | 13.5 | 22.4 | 9.7 | 18.6 | -14.3 | 7.0 | 15.3 | 9.4 | 14.2 | 13.8 | 24.7 | -6.3 |
| 234 | -4.9 | 16.7 | 4.8 | 13.6 | 2.7 | 12.3 | 6.0 | 20.3 | -6.3 | 5.3 | 24.5 | 2.5 | 17.1 | 12.0 | 11.0 | -9.8 |
| 235 | -8.3 | 17.5 | 9.4 | 11.2 | 23.1 | 16.8 | 13.5 | 2.8 | -6.2 | 9.3 | 2.1 | 8.0 | 23.2 | 14.0 | 21.4 | -8.9 |
| 236 | 1.6 | 8.1 | 18.1 | 2.3 | 18.2 | 11.1 | 3.2 | 9.4 | -7.3 | 1.2 | 16.8 | 13.8 | 2.2 | 17.5 | 8.4 | -7.5 |
| 237 | -1.9 | 22.3 | 13.6 | 23.1 | 17.7 | 9.6 | 17.7 | 15.0 | -6.4 | 14.5 | 10.3 | 8.2 | 21.6 | 23.7 | 8.8 | -2.5 |
| 238 | 3.0 | 2.9 | 18.0 | 9.2 | 11.8 | 3.8 | 14.0 | 5.6 | -10.6 | 4.8 | 10.6 | 17.0 | 20.1 | 10.0 | 6.4 | -3.9 |
| 239 | -0.5 | 24.0 | 7.8 | 10.2 | 23.4 | 12.7 | 16.7 | 16.3 | -6.1 | 22.5 | 13.6 | 14.6 | 20.0 | 11.4 | 9.0 | 1.7 |
| 240 | -7.7 | 0.3 | 12.0 | 0.8 | 10.3 | 3.8 | 20.3 | 17.3 | -5.2 | 3.2 | 14.5 | 1.5 | 4.6 | 14.3 | 13.5 | 3.8 |
| 241 | 4.3 | 14.6 | 9.8 | 3.6 | 9.9 | 12.2 | 0.7 | 10.5 | -14.4 | 7.5 | 2.1 | 8.6 | 17.8 | 10.8 | 10.3 | -9.5 |
| 242 | -0.3 | 4.9 | 16.5 | 23.3 | 5.7 | 19.5 | 0.6 | 17.8 | -7.2 | 21.3 | 22.4 | 20.7 | 24.7 | 8.6 | 16.3 | 3.5 |
| 243 | 3.3 | 5.3 | 20.4 | 11.1 | 10.2 | 18.1 | 9.6 | 3.4 | -3.3 | 19.2 | 22.5 | 8.3 | 12.7 | 6.4 | 13.2 | -8.8 |
| 244 | -7.5 | 0.0 | 13.1 | 17.0 | 11.3 | 11.5 | 19.9 | 10.6 | -9.2 | 14.1 | 12.9 | 6.3 | 6.7 | 14.4 | 24.4 | -7.0 |
| 245 | -2.7 | 11.7 | 22.2 | 1.3 | 10.7 | 13.5 | 5.4 | 20.7 | -3.0 | 23.0 | 23.7 | 18.6 | 15.6 | 8.6 | 21.3 | -4.2 |
| 246 | -5.0 | 5.4 | 8.9 | 20.4 | 12.7 | 11.6 | 6.9 | 6.5 | -11.3 | 19.8 | 20.1 | 24.6 | 11.0 | 20.2 | 5.6 | 3.3 |
| 247 | -4.2 | 1.6 | 21.8 | 19.9 | 6.1 | 13.3 | 3.0 | 0.6 | -6.9 | 2.7 | 3.6 | 6.4 | 5.0 | 21.5 | 12.0 | -0.8 |
| 248 | -3.4 | 13.2 | 20.2 | 13.4 | 9.4 | 22.0 | 7.0 | 3.6 | -7.6 | 16.7 | 20.0 | 1.6 | 15.3 | 24.4 | 11.7 | -4.4 |
| 249 | 2.0 | 3.7 | 22.0 | 4.1 | 20.7 | 3.5 | 24.7 | 4.1 | -0.9 | 7.8 | 18.8 | 2.4 | 13.9 | 20.9 | 16.2 | -7.4 |
| 250 | 0.7 | 18.8 | 15.4 | 23.9 | 0.9 | 14.6 | 14.0 | 17.3 | -2.8 | 9.5 | 23.7 | 9.6 | 10.0 | 16.2 | 10.3 | -0.7 |
| 251 | -3.0 | 15.6 | 11.1 | 18.4 | 12.3 | 1.2 | 19.8 | 11.9 | -11.6 | 21.9 | 0.1 | 4.0 | 15.2 | 7.2 | 23.2 | -3.4 |
| 252 | -0.1 | 5.0 | 18.1 | 22.1 | 8.6 | 7.5 | 18.2 | 16.8 | -4.9 | 3.3 | 22.1 | 15.8 | 8.6 | 10.8 | 12.6 | -9.0 |
| 253 | -8.1 | 10.8 | 8.0 | 23.2 | 19.9 | 18.2 | 17.0 | 16.6 | -6.2 | 20.6 | 19.2 | 8.5 | 12.6 | 8.9 | 12.3 | 2.3 |
| 254 | -5.8 | 24.1 | 16.5 | 14.0 | 19.3 | 15.2 | 11.1 | 22.8 | -4.2 | 8.0 | 22.1 | 2.6 | 20.1 | 19.8 | 18.0 | -6.0 |
| 255 | 1.9 | 4.3 | 20.1 | 16.6 | 1.5 | 22.5 | 2.4 | 24.1 | -13.0 | 12.9 | 17.4 | 5.3 | 22.8 | 20.6 | 14.4 | -7.1 |
| 256 | -7.7 | 9.8 | 15.7 | 23.5 | 22.1 | 6.0 | 5.3 | 0.3 | -8.1 | 5.0 | 1.0 | 23.2 | 24.1 | 12.5 | 7.6 | -4.0 |
| 257 | -4.6 | 19.4 | 2.9 | 0.9 | 0.7 | 19.3 | 17.2 | 0.3 | -13.8 | 6.4 | 6.4 | 8.9 | 13.8 | 9.3 | 14.3 | -3.3 |
| 258 | -1.5 | 10.6 | 1.8 | 1.0 | 10.2 | 7.7 | 10.5 | 21.7 | -0.8 | 17.8 | 15.8 | 18.7 | 13.4 | 18.2 | 23.7 | 2.3 |
| 259 | -5.5 | 12.1 | 6.5 | 7.6 | 6.8 | 0.7 | 15.9 | 23.9 | -12.7 | 15.6 | 18.3 | 5.4 | 10.3 | 9.7 | 18.2 | -9.3 |
| 260 | -6.9 | 5.2 | 23.0 | 7.9 | 3.5 | 10.6 | 9.9 | 16.2 | -6.8 | 23.4 | 22.6 | 21.8 | 6.8 | 17.5 | 20.0 | -8.0 |
| 261 | -6.1 | 2.3 | 4.4 | 4.0 | 2.0 | 15.8 | 0.5 | 9.0 | -7.4 | 6.8 | 20.0 | 3.2 | 15.4 | 22.0 | 10.5 | 1.3 |
| 262 | 5.0 | 0.7 | 5.7 | 15.7 | 21.0 | 6.4 | 16.2 | 12.5 | -2.7 | 24.7 | 3.6 | 3.8 | 22.9 | 24.4 | 24.3 | 4.5 |
| 263 | -7.3 | 10.7 | 14.0 | 10.7 | 24.0 | 17.1 | 18.7 | 23.1 | -4.5 | 10.2 | 8.8 | 5.4 | 12.1 | 8.6 | 5.3 | -5.4 |
| 264 | 3.8 | 23.1 | 18.9 | 1.7 | 7.9 | 20.4 | 8.4 | 1.4 | -12.2 | 16.0 | 15.0 | 18.0 | 21.5 | 8.9 | 10.0 | -4.1 |
| 265 | -2.7 | 24.0 | 24.9 | 24.6 | 1.4 | 23.4 | 13.6 | 7.3 | -2.6 | 19.1 | 13.0 | 5.4 | 24.8 | 23.1 | 23.0 | -8.4 |
| 266 | 3.6 | 16.6 | 9.9 | 11.0 | 3.5 | 14.9 | 5.1 | 23.5 | -9.5 | 24.6 | 19.3 | 6.9 | 17.8 | 11.5 | 13.5 | 2.5 |
| 267 | 0.1 | 11.8 | 19.9 | 22.3 | 14.9 | 4.8 | 13.4 | 1.2 | -7.1 | 5.9 | 13.9 | 7.4 | 20.3 | 16.3 | 7.4 | 2.0 |
| 268 | -1.6 | 22.3 | 12.5 | 2.0 | 6.1 | 12.4 | 15.8 | 10.5 | -3.1 | 4.1 | 3.4 | 12.2 | 7.7 | 13.1 | 11.9 | 3.8 |
| 269 | -8.3 | 21.3 | 5.1 | 8.3 | 22.7 | 9.4 | 6.6 | 8.6 | -11.3 | 16.0 | 13.5 | 21.1 | 17.6 | 10.9 | 7.0 | -1.9 |
| 270 | -4.6 | 8.9 | 9.6 | 11.8 | 13.6 | 4.2 | 6.6 | 21.4 | -2.9 | 17.0 | 15.0 | 22.3 | 6.5 | 19.7 | 24.1 | -3.3 |
| 271 | 1.5 | 12.6 | 11.3 | 1.4 | 8.1 | 15.9 | 22.1 | 13.4 | -0.8 | 19.5 | 11.5 | 0.9 | 20.1 | 15.7 | 18.9 | 4.5 |
| 272 | 2.8 | 3.6 | 13.8 | 15.0 | 5.6 | 13.6 | 8.5 | 13.9 | -3.0 | 16.5 | 21.1 | 12.0 | 18.9 | 13.1 | 7.9 | -5.2 |
| 273 | -4.5 | 0.2 | 10.5 | 12.7 | 3.2 | 24.2 | 21.8 | 20.4 | -6.4 | 4.5 | 18.8 | 1.2 | 21.6 | 12.9 | 22.8 | -9.9 |
| 274 | 4.8 | 13.5 | 18.9 | 7.0 | 17.1 | 24.3 | 2.2 | 2.2 | -0.6 | 11.4 | 24.1 | 9.4 | 9.5 | 13.9 | 9.1 | -9.3 |
| 275 | 2.4 | 23.3 | 2.2 | 24.6 | 14.6 | 19.4 | 18.3 | 14.7 | -6.2 | 20.2 | 7.5 | 5.2 | 15.0 | 12.4 | 7.3 | -7.2 |
| 276 | -3.8 | 21.6 | 3.1 | 14.4 | 22.1 | 4.4 | 22.2 | 15.9 | -4.9 | 24.1 | 4.4 | 23.4 | 7.2 | 16.8 | 14.0 | 2.5 |
| 277 | -0.9 | 8.5 | 4.0 | 13.5 | 2.5 | 12.2 | 17.2 | 5.7 | -5.7 | 17.2 | 23.5 | 14.5 | 8.7 | 19.7 | 23.9 | 1.0 |
| 278 | -5.9 | 11.1 | 20.9 | 15.6 | 3.2 | 19.2 | 12.1 | 0.4 | -1.3 | 21.0 | 6.3 | 10.3 | 19.6 | 17.3 | 7.9 | -2.2 |
| 279 | -1.8 | 23.5 | 14.0 | 0.5 | 5.9 | 3.8 | 21.5 | 24.2 | -9.9 | 10.8 | 17.6 | 24.5 | 19.2 | 7.3 | 10.5 | 0.8 |
| 280 | -1.2 | 22.2 | 10.6 | 1.5 | 21.3 | 16.5 | 13.2 | 2.3 | -14.3 | 18.3 | 13.0 | 10.4 | 3.4 | 17.1 | 7.4 | -2.2 |
| 281 | 0.4 | 18.5 | 8.6 | 9.5 | 2.2 | 15.3 | 22.8 | 2.1 | -6.9 | 22.7 | 5.0 | 19.9 | 15.3 | 12.3 | 20.5 | 0.6 |
| 282 | -2.8 | 15.1 | 14.2 | 0.0 | 11.3 | 16.1 | 12.7 | 23.7 | -6.9 | 0.3 | 19.1 | 6.4 | 17.2 | 11.3 | 18.4 | 3.6 |
| 283 | -3.7 | 21.8 | 8.9 | 9.8 | 24.0 | 17.3 | 1.8 | 4.5 | -1.8 | 20.4 | 18.5 | 17.2 | 9.9 | 5.9 | 10.6 | -4.8 |
| 284 | 1.1 | 6.5 | 8.9 | 12.3 | 12.7 | 8.0 | 21.8 | 8.5 | -13.2 | 6.7 | 1.7 | 9.9 | 11.5 | 21.8 | 21.6 | 3.2 |
| 285 | -5.4 | 10.0 | 19.3 | 13.0 | 13.3 | 16.7 | 4.2 | 7.8 | -11.9 | 0.2 | 18.8 | 3.0 | 17.7 | 15.3 | 9.8 | -6.5 |
| 286 | -4.9 | 17.9 | 19.9 | 7.4 | 11.8 | 0.5 | 3.5 | 17.5 | -6.0 | 18.8 | 10.6 | 5.5 | 4.3 | 6.5 | 19.4 | 2.8 |
| 287 | 0.3 | 24.0 | 8.1 | 21.3 | 19.1 | 6.1 | 1.6 | 19.2 | -11.1 | 21.7 | 22.2 | 4.9 | 9.6 | 6.3 | 14.9 | -1.0 |
| 288 | -8.9 | 15.4 | 5.4 | 23.1 | 20.6 | 11.4 | 14.2 | 6.2 | -8.6 | 14.1 | 19.8 | 16.8 | 18.9 | 9.8 | 19.2 | 2.0 |
| 289 | -9.9 | 24.4 | 3.9 | 5.3 | 11.2 | 3.2 | 23.7 | 19.7 | -5.0 | 19.2 | 3.4 | 18.0 | 18.6 | 9.0 | 5.9 | -2.3 |
| 290 | 2.7 | 14.8 | 23.0 | 15.9 | 21.9 | 1.0 | 21.6 | 21.1 | -11.0 | 11.4 | 15.0 | 11.9 | 9.1 | 24.9 | 7.0 | 3.6 |
| 291 | 3.9 | 18.9 | 24.9 | 24.6 | 24.6 | 18.8 | 24.3 | 9.3 | -12.4 | 24.1 | 13.2 | 22.3 | 2.5 | 10.2 | 9.7 | 2.9 |
| 292 | -2.3 | 13.8 | 7.5 | 21.8 | 11.1 | 11.0 | 15.0 | 2.4 | -6.5 | 20.9 | 16.0 | 20.4 | 19.8 | 7.7 | 17.0 | 2.3 |
| 293 | -2.9 | 2.1 | 2.2 | 22.8 | 0.3 | 10.5 | 16.2 | 20.8 | -3.2 | 5.2 | 12.7 | 19.0 | 3.9 | 13.3 | 19.2 | -1.6 |
| 294 | -3.2 | 8.9 | 0.9 | 5.1 | 19.7 | 4.4 | 17.8 | 20.4 | -12.6 | 21.0 | 19.6 | 17.8 | 17.7 | 17.9 | 16.0 | 3.8 |
| 295 | -0.3 | 22.9 | 24.6 | 13.1 | 18.2 | 21.3 | 18.9 | 3.4 | -1.0 | 6.8 | 17.4 | 8.7 | 18.0 | 8.2 | 11.9 | 0.2 |
| 296 | -0.2 | 16.6 | 3.0 | 24.4 | 9.5 | 17.0 | 11.2 | 10.6 | -2.9 | 4.7 | 5.4 | 10.5 | 15.4 | 19.2 | 23.4 | -3.4 |
| 297 | 0.3 | 21.9 | 18.5 | 11.9 | 12.1 | 16.7 | 6.2 | 17.7 | -2.0 | 0.5 | 6.5 | 0.9 | 2.8 | 22.6 | 7.7 | -3.6 |
| 298 | 2.9 | 21.6 | 18.6 | 20.5 | 9.5 | 4.3 | 19.2 | 2.1 | -8.6 | 1.7 | 16.7 | 6.9 | 15.3 | 5.9 | 16.9 | -3.3 |
| 299 | -4.3 | 12.3 | 10.9 | 22.1 | 6.4 | 4.2 | 22.0 | 6.0 | -7.8 | 24.9 | 16.4 | 14.1 | 24.7 | 21.2 | 23.4 | -0.6 |
| 300 | 4.4 | 7.0 | 6.8 | 2.2 | 22.8 | 17.9 | 24.1 | 0.7 | -3.1 | 17.3 | 1.1 | 16.7 | 16.6 | 7.3 | 21.7 | -1.9 |

valley loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 301 | -5.2 | 22.0 | 15.5 | 14.7 | 16.8 | 20.4 | 18.8 | 7.7 | -8.2 | 3.1 | 16.6 | 18.8 | 17.1 | 5.4 | 10.9 | -1.0 |
| 302 | -8.1 | 2.7 | 6.0 | 16.9 | 21.3 | 4.4 | 15.0 | 3.3 | -2.3 | 9.3 | 24.2 | 11.9 | 8.2 | 5.7 | 11.5 | 0.6 |
| 303 | 4.5 | 1.3 | 23.1 | 17.7 | 1.0 | 14.6 | 18.9 | 15.4 | -8.6 | 23.9 | 22.4 | 15.4 | 2.6 | 5.9 | 6.1 | 0.3 |
| 304 | -2.5 | 20.9 | 11.7 | 3.6 | 20.0 | 23.6 | 14.0 | 10.8 | -2.7 | 5.3 | 22.5 | 2.6 | 9.9 | 16.7 | 20.2 | 3.4 |
| 305 | -2.4 | 23.2 | 4.7 | 10.3 | 1.4 | 19.8 | 7.0 | 13.8 | -4.2 | 11.9 | 5.4 | 10.9 | 6.0 | 15.1 | 10.9 | -1.6 |
| 306 | -3.1 | 11.4 | 5.5 | 2.0 | 2.2 | 9.9 | 2.0 | 20.1 | -4.5 | 14.2 | 5.2 | 16.9 | 14.2 | 6.2 | 17.3 | -4.8 |
| 307 | -2.2 | 5.2 | 16.9 | 18.2 | 17.0 | 13.7 | 8.1 | 0.2 | -11.9 | 10.2 | 3.8 | 5.8 | 13.3 | 9.5 | 21.6 | 1.1 |
| 308 | -3.8 | 20.0 | 17.3 | 23.8 | 8.5 | 4.4 | 14.3 | 8.2 | -12.9 | 17.0 | 20.7 | 9.7 | 2.3 | 6.1 | 9.8 | 2.5 |
| 309 | -1.7 | 24.3 | 15.9 | 12.4 | 3.8 | 4.6 | 9.0 | 15.6 | -10.6 | 4.2 | 23.6 | 6.2 | 14.1 | 9.7 | 16.9 | -0.4 |
| 310 | -4.9 | 4.9 | 18.7 | 0.3 | 18.9 | 13.1 | 14.4 | 13.0 | -5.5 | 9.6 | 8.8 | 5.4 | 3.1 | 22.8 | 22.8 | 0.5 |
| 311 | -6.0 | 14.2 | 8.9 | 16.9 | 17.0 | 23.5 | 1.4 | 1.1 | -9.3 | 3.2 | 1.6 | 4.6 | 3.2 | 24.3 | 8.8 | -1.8 |
| 312 | -3.2 | 0.8 | 14.6 | 11.1 | 21.4 | 19.8 | 16.9 | 6.6 | -3.0 | 17.8 | 21.6 | 16.0 | 15.9 | 13.4 | 9.3 | 2.0 |
| 313 | 1.7 | 8.7 | 0.6 | 3.6 | 4.4 | 4.4 | 17.5 | 7.2 | -9.8 | 0.8 | 5.0 | 5.4 | 16.0 | 11.1 | 8.3 | -1.8 |
| 314 | 4.2 | 9.8 | 23.9 | 12.0 | 9.1 | 21.8 | 14.5 | 11.6 | -4.9 | 5.8 | 3.5 | 20.5 | 5.7 | 19.1 | 6.3 | 0.8 |
| 315 | -2.0 | 0.9 | 3.1 | 18.6 | 21.5 | 9.3 | 8.0 | 22.3 | -10.0 | 6.4 | 13.4 | 19.0 | 0.5 | 16.8 | 20.0 | 2.7 |
| 316 | -4.0 | 23.5 | 0.2 | 11.8 | 1.7 | 2.0 | 9.5 | 18.0 | -4.4 | 3.4 | 7.5 | 1.1 | 10.3 | 14.3 | 21.0 | 0.1 |
| 317 | 0.8 | 5.8 | 12.0 | 21.1 | 12.4 | 13.3 | 12.0 | 14.7 | -3.1 | 19.3 | 19.8 | 1.8 | 20.2 | 24.7 | 5.1 | 0.0 |
| 318 | -1.0 | 4.8 | 13.1 | 19.8 | 0.4 | 21.5 | 2.5 | 23.3 | -8.4 | 3.4 | 24.5 | 15.7 | 13.8 | 8.6 | 6.7 | 2.4 |
| 319 | 0.6 | 16.4 | 4.2 | 2.4 | 11.0 | 9.9 | 7.1 | 1.4 | -2.7 | 0.3 | 6.8 | 15.6 | 11.2 | 16.6 | 11.7 | 0.6 |
| 320 | 0.8 | 5.2 | 20.5 | 6.4 | 3.0 | 9.2 | 6.8 | 13.4 | -1.9 | 13.4 | 8.3 | 10.0 | 13.4 | 15.5 | 13.0 | -0.5 |
| 321 | 3.5 | 6.8 | 17.9 | 3.4 | 13.5 | 14.0 | 18.9 | 24.3 | -9.6 | 3.7 | 17.4 | 2.4 | 12.5 | 20.0 | 9.7 | 3.6 |
| 322 | 4.4 | 12.4 | 0.6 | 17.8 | 12.7 | 5.9 | 15.5 | 15.0 | -8.6 | 22.5 | 18.1 | 6.7 | 3.4 | 22.3 | 11.3 | -2.7 |
| 323 | 1.5 | 17.3 | 4.2 | 1.4 | 24.9 | 23.2 | 8.1 | 22.6 | -5.9 | 4.4 | 20.8 | 10.8 | 14.1 | 8.6 | 10.8 | -3.1 |
| 324 | 1.3 | 21.4 | 15.5 | 15.0 | 18.4 | 9.0 | 15.4 | 23.4 | -5.2 | 9.1 | 14.9 | 25.0 | 17.0 | 17.5 | 14.1 | -1.5 |
| 325 | 1.2 | 23.8 | 10.4 | 22.4 | 18.9 | 8.8 | 9.3 | 1.3 | -7.3 | 3.2 | 9.2 | 22.7 | 13.3 | 23.2 | 6.0 | -0.5 |
| 326 | 2.7 | 4.0 | 7.4 | 21.2 | 0.2 | 15.2 | 19.0 | 17.4 | -6.4 | 5.8 | 3.2 | 6.6 | 2.8 | 11.6 | 7.4 | -2.9 |
| 327 | -4.6 | 6.3 | 1.4 | 14.0 | 1.9 | 14.4 | 22.5 | 11.1 | -7.5 | 7.2 | 23.0 | 23.3 | 5.0 | 11.8 | 22.3 | -0.9 |
| 328 | -1.7 | 14.8 | 21.5 | 18.1 | 6.3 | 6.0 | 5.4 | 3.2 | -1.4 | 16.5 | 14.9 | 19.5 | 3.4 | 15.6 | 19.6 | 2.7 |
| 329 | -4.6 | 4.8 | 1.2 | 10.7 | 21.6 | 24.0 | 11.7 | 18.9 | -1.1 | 5.4 | 10.3 | 3.0 | 3.8 | 14.1 | 23.0 | -2.4 |
| 330 | 1.9 | 18.0 | 4.3 | 19.5 | 9.1 | 15.4 | 23.7 | 24.3 | -4.1 | 8.4 | 2.7 | 13.2 | 20.2 | 13.1 | 7.7 | 0.9 |
| 331 | -0.7 | 10.0 | 23.3 | 13.0 | 18.3 | 1.3 | 4.1 | 18.2 | -2.2 | 16.7 | 13.8 | 20.2 | 16.9 | 10.9 | 24.3 | -1.8 |
| 332 | 3.8 | 19.7 | 15.0 | 16.0 | 19.8 | 19.5 | 5.5 | 14.0 | -12.7 | 3.0 | 4.2 | 10.8 | 6.8 | 19.2 | 17.0 | -2.7 |
| 333 | -3.0 | 18.9 | 12.0 | 13.5 | 4.1 | 22.5 | 17.4 | 14.2 | -11.0 | 6.4 | 6.2 | 23.8 | 19.0 | 6.8 | 6.2 | -3.1 |
| 334 | -4.7 | 19.1 | 23.6 | 17.5 | 5.1 | 12.1 | 8.6 | 19.7 | -5.7 | 10.3 | 19.7 | 5.1 | 6.7 | 9.5 | 7.5 | -1.5 |
| 335 | 4.0 | 2.4 | 16.5 | 15.5 | 2.2 | 12.3 | 24.2 | 14.2 | -4.9 | 7.8 | 0.0 | 2.6 | 14.6 | 13.4 | 18.5 | 0.2 |
| 336 | -2.5 | 5.9 | 4.5 | 17.8 | 9.9 | 5.8 | 12.7 | 23.8 | -6.4 | 0.3 | 17.1 | 11.6 | 25.0 | 9.2 | 8.8 | -1.9 |
| 337 | -4.4 | 6.6 | 12.4 | 18.4 | 3.2 | 20.8 | 4.6 | 24.8 | -0.2 | 13.0 | 0.1 | 19.2 | 5.9 | 13.3 | 23.5 | 1.5 |
| 338 | 2.9 | 7.3 | 4.9 | 18.0 | 0.8 | 24.7 | 16.7 | 3.1 | -11.0 | 2.6 | 12.5 | 16.5 | 2.3 | 16.6 | 21.3 | 2.5 |
| 339 | 2.0 | 2.1 | 8.0 | 13.6 | 10.5 | 21.1 | 15.8 | 4.7 | -0.9 | 6.5 | 18.1 | 3.8 | 20.0 | 22.0 | 19.8 | -1.4 |
| 340 | 2.6 | 23.3 | 14.1 | 0.4 | 8.3 | 15.2 | 3.9 | 19.0 | -9.6 | 11.2 | 24.0 | 19.5 | 11.1 | 19.8 | 18.1 | -3.7 |
| 341 | -4.1 | 22.7 | 1.7 | 21.3 | 24.3 | 0.9 | 11.2 | 23.8 | -11.3 | 5.2 | 16.9 | 11.7 | 16.8 | 21.9 | 9.9 | -3.7 |
| 342 | -0.1 | 1.5 | 22.4 | 7.2 | 14.7 | 5.6 | 16.1 | 20.6 | -1.0 | 23.5 | 20.1 | 11.7 | 13.2 | 24.1 | 8.3 | -2.1 |
| 343 | 2.3 | 14.1 | 22.0 | 21.0 | 1.1 | 3.5 | 16.4 | 13.4 | -4.2 | 3.7 | 23.3 | 17.9 | 8.0 | 5.9 | 13.4 | -1.4 |
| 344 | -1.5 | 6.3 | 23.1 | 10.8 | 1.4 | 14.7 | 13.7 | 21.1 | -12.3 | 19.7 | 13.2 | 14.4 | 19.7 | 23.0 | 17.9 | 4.6 |
| 345 | 1.5 | 16.6 | 23.8 | 9.7 | 18.5 | 5.9 | 2.2 | 3.5 | -11.1 | 18.8 | 4.9 | 13.8 | 8.9 | 10.5 | 22.3 | -4.6 |
| 346 | -3.1 | 23.1 | 10.8 | 16.6 | 11.6 | 18.5 | 18.0 | 23.5 | -12.0 | 8.9 | 9.2 | 4.4 | 18.7 | 21.1 | 22.6 | 0.0 |
| 347 | -3.4 | 15.7 | 22.6 | 4.4 | 2.0 | 3.2 | 23.5 | 2.7 | -10.4 | 15.3 | 13.9 | 21.7 | 9.4 | 14.3 | 8.0 | 0.3 |
| 348 | -2.2 | 4.1 | 18.0 | 16.5 | 23.9 | 6.9 | 13.5 | 22.8 | -2.9 | 8.7 | 14.1 | 18.6 | 3.9 | 22.8 | 20.3 | -4.5 |
| 349 | -2.0 | 7.1 | 7.3 | 13.5 | 8.9 | 24.0 | 0.5 | 13.4 | -3.6 | 4.5 | 2.1 | 20.3 | 22.1 | 22.3 | 15.0 | -2.3 |
| 350 | 2.2 | 20.9 | 2.2 | 11.6 | 15.1 | 18.6 | 9.4 | 2.2 | -8.8 | 16.5 | 9.9 | 9.3 | 16.7 | 21.1 | 9.4 | -0.7 |
| 351 | 3.7 | 23.1 | 17.0 | 14.3 | 7.1 | 21.9 | 1.8 | 21.5 | -2.0 | 3.3 | 14.2 | 11.8 | 9.2 | 6.0 | 20.0 | -3.6 |
| 352 | 4.8 | 6.5 | 4.8 | 15.6 | 16.8 | 10.9 | 3.6 | 19.5 | -6.6 | 11.0 | 23.7 | 6.6 | 1.2 | 22.2 | 20.4 | 3.6 |
| 353 | 0.8 | 24.7 | 9.8 | 20.7 | 9.6 | 9.6 | 9.2 | 17.5 | -14.2 | 2.5 | 14.6 | 3.0 | 7.5 | 18.6 | 5.7 | -1.7 |
| 354 | 3.3 | 11.5 | 9.4 | 9.1 | 11.4 | 14.4 | 11.5 | 9.6 | -6.0 | 11.3 | 8.8 | 2.3 | 11.8 | 11.1 | 18.5 | 1.6 |
| 355 | 1.4 | 15.2 | 4.6 | 13.9 | 17.8 | 19.6 | 11.8 | 24.0 | -1.9 | 14.0 | 11.5 | 22.0 | 8.0 | 20.1 | 14.4 | -4.4 |
| 356 | -2.4 | 6.7 | 3.8 | 17.4 | 22.4 | 18.2 | 4.7 | 6.4 | -11.5 | 24.8 | 6.2 | 17.5 | 18.7 | 17.7 | 5.7 | 4.5 |
| 357 | 4.4 | 3.5 | 0.7 | 17.2 | 1.5 | 9.1 | 21.8 | 14.8 | -10.0 | 14.8 | 7.4 | 21.1 | 20.4 | 20.7 | 8.3 | -0.3 |
| 358 | -4.3 | 1.2 | 14.7 | 5.2 | 15.5 | 22.8 | 11.3 | 4.8 | -11.1 | 0.7 | 9.6 | 11.4 | 4.2 | 18.9 | 5.5 | -2.3 |
| 359 | 1.9 | 12.7 | 23.3 | 2.7 | 3.2 | 16.1 | 21.8 | 12.7 | -3.5 | 24.6 | 17.1 | 6.2 | 4.4 | 19.2 | 10.3 | 4.0 |
| 360 | -3.9 | 11.6 | 7.5 | 20.0 | 2.0 | 18.8 | 24.7 | 12.3 | -2.7 | 5.2 | 11.5 | 19.9 | 13.9 | 20.2 | 18.7 | 1.7 |
| 361 | 2.4 | 18.9 | 12.5 | 3.0 | 20.5 | 9.0 | 14.6 | 5.0 | -2.8 | 4.4 | 21.8 | 25.0 | 8.2 | 6.2 | 23.2 | 1.0 |
| 362 | -1.0 | 11.1 | 20.9 | 18.6 | 9.0 | 11.3 | 23.9 | 17.6 | -11.2 | 1.5 | 8.8 | 3.6 | 14.6 | 24.4 | 22.5 | -0.5 |
| 363 | -3.8 | 6.5 | 21.4 | 9.8 | 4.3 | 5.4 | 17.0 | 14.2 | -8.2 | 14.4 | 3.9 | 1.6 | 24.8 | 10.3 | 15.2 | 2.5 |
| 364 | -3.4 | 19.4 | 19.5 | 9.9 | 19.5 | 17.6 | 17.5 | 0.2 | -3.9 | 4.1 | 12.0 | 17.9 | 24.5 | 13.6 | 11.9 | 2.1 |
| 365 | 3.6 | 10.2 | 17.1 | 6.3 | 19.5 | 13.5 | 21.6 | 18.7 | -6.8 | 4.1 | 9.2 | 13.5 | 10.0 | 14.4 | 24.3 | 0.7 |
| 366 | 1.9 | 23.6 | 15.7 | 18.1 | 6.8 | 6.0 | 17.5 | 21.9 | -7.7 | 1.6 | 0.3 | 2.9 | 17.2 | 10.8 | 13.5 | -3.9 |
| 367 | -4.3 | 5.0 | 15.7 | 13.5 | 20.3 | 4.5 | 10.2 | 18.0 | -12.2 | 13.5 | 16.0 | 15.9 | 15.4 | 6.3 | 7.7 | 0.0 |
| 368 | -2.9 | 17.7 | 7.2 | 24.1 | 2.2 | 11.6 | 5.4 | 15.6 | -1.7 | 19.7 | 23.0 | 0.1 | 23.0 | 22.0 | 10.0 | 1.2 |
| 369 | -2.6 | 7.8 | 24.1 | 22.6 | 7.5 | 11.8 | 13.9 | 10.9 | -9.6 | 6.8 | 8.4 | 12.5 | 8.7 | 18.1 | 14.6 | -2.9 |
| 370 | 2.0 | 21.4 | 20.8 | 11.3 | 16.0 | 5.3 | 18.1 | 23.8 | -8.5 | 12.8 | 12.6 | 15.1 | 8.7 | 10.8 | 23.0 | -3.3 |
| 371 | -2.7 | 19.9 | 9.0 | 11.0 | 2.4 | 6.2 | 19.6 | 16.8 | -14.9 | 2.4 | 16.9 | 19.5 | 8.1 | 7.6 | 17.4 | -2.8 |
| 372 | 1.0 | 24.1 | 9.2 | 15.1 | 15.5 | 20.3 | 5.3 | 1.0 | -5.2 | 22.8 | 18.6 | 4.6 | 14.8 | 22.9 | 20.5 | -0.1 |
| 373 | 1.2 | 6.9 | 24.4 | 20.1 | 9.4 | 9.8 | 13.2 | 23.7 | 0.0 | 0.3 | 19.9 | 22.3 | 13.4 | 7.6 | 24.7 | 4.4 |
| 374 | -4.0 | 8.5 | 6.5 | 24.3 | 9.2 | 22.2 | 4.6 | 8.6 | -7.1 | 15.5 | 5.1 | 20.8 | 9.4 | 5.3 | 11.0 | 3.4 |
| 375 | 0.3 | 6.2 | 11.4 | 9.5 | 0.3 | 3.3 | 19.3 | 17.5 | -3.8 | 13.9 | 19.5 | 10.0 | 4.3 | 16.4 | 5.5 | 0.8 |

valley loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 376 | -1.9 | 9.5 | 14.8 | 22.3 | 3.9 | 8.2 | 12.9 | 7.2 | -5.3 | 24.9 | 2.1 | 2.8 | 3.3 | 5.8 | 7.3 | -3.7 |
| 377 | 4.6 | 22.0 | 10.7 | 18.9 | 5.6 | 13.7 | 15.5 | 3.0 | -11.1 | 0.7 | 5.4 | 0.9 | 1.9 | 10.0 | 14.0 | 4.3 |
| 378 | 2.0 | 10.4 | 10.5 | 14.6 | 3.8 | 20.0 | 14.4 | 16.7 | -5.2 | 1.1 | 24.8 | 22.2 | 15.6 | 7.1 | 7.2 | 3.7 |
| 379 | -0.5 | 9.3 | 21.6 | 7.6 | 20.9 | 8.7 | 16.2 | 19.9 | -3.9 | 9.3 | 15.1 | 9.5 | 9.6 | 20.4 | 22.8 | -4.2 |
| 380 | 1.4 | 15.2 | 12.9 | 6.3 | 9.8 | 17.4 | 24.4 | 7.5 | -10.5 | 19.6 | 8.5 | 12.3 | 1.8 | 6.3 | 9.6 | 1.2 |
| 381 | -0.1 | 25.0 | 7.2 | 11.8 | 15.5 | 13.2 | 7.4 | 7.9 | -11.8 | 17.7 | 11.7 | 6.4 | 7.1 | 24.4 | 13.0 | -0.6 |
| 382 | -3.0 | 19.1 | 25.0 | 14.1 | 24.5 | 4.0 | 20.1 | 21.3 | -7.7 | 4.2 | 10.6 | 5.1 | 24.6 | 11.1 | 17.0 | 2.7 |
| 383 | 1.0 | 5.1 | 20.2 | 6.4 | 17.6 | 6.3 | 5.2 | 7.6 | -9.0 | 4.6 | 6.9 | 6.1 | 22.3 | 20.4 | 17.9 | 4.1 |
| 384 | -4.2 | 17.2 | 23.3 | 7.3 | 9.9 | 19.2 | 10.5 | 15.9 | -8.8 | 21.1 | 0.9 | 14.1 | 9.9 | 13.2 | 24.3 | -4.8 |
| 385 | -1.2 | 17.3 | 24.6 | 8.1 | 21.7 | 4.0 | 17.2 | 1.9 | -7.6 | 1.1 | 19.0 | 19.5 | 20.4 | 7.6 | 9.7 | 1.4 |
| 386 | 0.0 | 17.4 | 15.3 | 15.6 | 2.0 | 24.3 | 18.9 | 8.5 | -3.5 | 9.9 | 17.6 | 2.2 | 1.1 | 5.4 | 21.6 | -3.1 |
| 387 | -1.7 | 23.0 | 13.2 | 7.7 | 5.1 | 12.0 | 15.0 | 0.9 | -13.7 | 17.7 | 1.1 | 16.6 | 2.7 | 10.6 | 13.4 | 1.7 |
| 388 | 3.0 | 21.5 | 10.8 | 11.2 | 4.0 | 16.1 | 13.7 | 17.5 | -1.5 | 11.2 | 1.8 | 8.2 | 18.7 | 8.3 | 19.9 | 4.7 |
| 389 | 4.7 | 7.5 | 7.3 | 8.7 | 4.6 | 5.0 | 5.9 | 19.9 | -6.1 | 8.2 | 20.8 | 14.3 | 18.3 | 21.2 | 5.9 | -2.0 |
| 390 | 0.2 | 18.2 | 12.1 | 9.8 | 12.3 | 14.0 | 17.0 | 13.6 | -9.1 | 21.8 | 7.0 | 14.1 | 16.2 | 21.1 | 10.8 | 2.9 |
| 391 | -4.3 | 19.3 | 20.0 | 17.3 | 8.8 | 12.9 | 8.7 | 14.7 | -10.2 | 21.5 | 16.0 | 16.6 | 19.9 | 19.1 | 18.4 | 0.2 |
| 392 | 0.5 | 10.9 | 22.7 | 21.4 | 13.0 | 16.4 | 0.7 | 3.1 | -8.6 | 2.3 | 7.8 | 1.8 | 16.5 | 22.3 | 11.3 | 2.7 |
| 393 | -0.6 | 6.7 | 7.3 | 7.6 | 1.0 | 24.9 | 24.9 | 4.7 | -10.4 | 10.6 | 17.9 | 2.2 | 22.1 | 12.6 | 22.2 | 4.2 |
| 394 | -4.9 | 24.1 | 12.1 | 15.5 | 9.2 | 10.1 | 11.1 | 6.2 | -12.8 | 19.2 | 14.0 | 15.6 | 2.2 | 7.9 | 14.8 | 2.9 |
| 395 | -0.2 | 19.5 | 6.7 | 23.6 | 17.2 | 18.7 | 21.8 | 21.1 | -4.7 | 6.6 | 5.0 | 11.8 | 11.3 | 13.0 | 10.9 | 0.0 |
| 396 | 0.6 | 19.5 | 24.8 | 23.2 | 7.5 | 6.6 | 18.9 | 1.5 | -8.8 | 19.6 | 6.5 | 10.9 | 17.5 | 18.3 | 9.9 | 4.0 |
| 397 | 4.8 | 23.9 | 22.5 | 23.4 | 4.5 | 12.4 | 9.1 | 24.8 | -12.3 | 1.6 | 15.3 | 21.6 | 16.3 | 18.4 | 23.1 | 2.9 |
| 398 | 4.9 | 13.3 | 12.5 | 5.2 | 22.8 | 12.9 | 9.3 | 10.3 | -10.5 | 23.8 | 6.5 | 15.1 | 13.4 | 14.2 | 15.2 | 4.0 |
| 399 | 0.0 | 7.4 | 13.8 | 6.2 | 14.1 | 12.1 | 3.7 | 23.1 | -14.9 | 11.2 | 14.2 | 20.7 | 0.6 | 18.1 | 22.3 | -4.0 |
| 400 | 0.0 | 24.7 | 16.7 | 10.9 | 22.3 | 5.4 | 3.4 | 19.7 | -5.2 | 3.8 | 15.6 | 15.9 | 17.1 | 21.2 | 16.8 | -4.6 |
| 401 | -4.1 | 7.8 | 20.4 | 9.5 | 17.4 | 6.2 | 21.7 | 9.6 | -4.6 | 6.1 | 10.3 | 24.5 | 15.8 | 10.2 | 24.8 | -1.1 |
| 402 | 3.2 | 17.7 | 11.4 | 7.3 | 2.8 | 17.0 | 20.2 | 6.4 | -1.9 | 22.2 | 3.7 | 13.7 | 14.7 | 16.3 | 15.0 | -0.1 |
| 403 | -1.8 | 15.4 | 21.2 | 6.2 | 3.3 | 2.7 | 15.0 | 19.8 | -5.7 | 6.1 | 8.8 | 10.4 | 5.9 | 23.9 | 13.2 | 2.5 |
| 404 | 0.9 | 25.0 | 7.2 | 10.2 | 11.3 | 15.4 | 16.2 | 5.5 | -13.9 | 13.9 | 9.2 | 11.6 | 0.1 | 22.3 | 22.5 | 2.1 |
| 405 | 3.0 | 16.6 | 22.6 | 17.7 | 12.4 | 23.7 | 6.1 | 20.2 | -10.8 | 8.4 | 9.7 | 3.7 | 1.3 | 20.8 | 11.9 | 1.7 |
| 406 | -1.3 | 17.6 | 18.3 | 7.3 | 21.7 | 18.7 | 13.4 | 0.7 | -4.0 | 5.8 | 13.9 | 20.6 | 3.3 | 16.5 | 17.9 | -4.4 |
| 407 | 2.4 | 12.1 | 11.4 | 14.9 | 17.7 | 21.6 | 17.8 | 22.7 | -1.6 | 11.5 | 6.1 | 23.1 | 2.4 | 18.0 | 12.1 | 3.0 |
| 408 | -2.6 | 17.2 | 24.3 | 13.2 | 7.4 | 0.5 | 23.0 | 17.9 | -1.1 | 12.5 | 10.5 | 5.3 | 2.3 | 16.5 | 9.7 | -3.2 |
| 409 | -1.6 | 21.7 | 17.8 | 22.9 | 7.1 | 22.7 | 8.5 | 0.3 | -9.9 | 23.5 | 5.6 | 5.7 | 13.6 | 7.0 | 24.8 | -4.3 |
| 410 | -4.9 | 17.4 | 12.5 | 13.5 | 21.7 | 22.6 | 2.3 | 23.2 | -11.6 | 0.4 | 3.6 | 22.6 | 17.9 | 22.2 | 11.8 | -2.7 |
| 411 | 1.2 | 7.9 | 6.4 | 12.8 | 4.8 | 18.9 | 11.7 | 14.1 | -12.1 | 14.2 | 10.5 | 24.1 | 14.0 | 22.9 | 16.6 | 1.6 |
| 412 | -1.7 | 20.8 | 21.4 | 19.0 | 3.4 | 18.6 | 13.1 | 13.6 | -1.6 | 13.4 | 2.2 | 23.4 | 16.9 | 15.2 | 5.9 | -4.8 |
| 413 | 1.5 | 14.2 | 16.4 | 21.3 | 10.7 | 16.2 | 6.9 | 8.5 | -4.6 | 12.6 | 3.1 | 20.0 | 14.7 | 16.0 | 17.5 | -0.9 |
| 414 | 4.5 | 15.9 | 17.1 | 10.9 | 10.3 | 1.1 | 12.7 | 7.9 | -8.3 | 20.9 | 6.8 | 16.5 | 4.2 | 19.9 | 13.7 | 5.0 |
| 415 | -2.8 | 10.0 | 22.5 | 5.3 | 3.2 | 24.7 | 23.7 | 23.7 | -6.6 | 6.3 | 13.7 | 22.5 | 13.8 | 18.0 | 7.8 | -4.4 |
| 416 | -4.8 | 22.4 | 9.9 | 24.4 | 2.2 | 5.6 | 11.6 | 5.2 | -8.6 | 22.9 | 0.9 | 10.1 | 1.9 | 9.2 | 20.9 | 2.1 |
| 417 | -3.4 | 18.3 | 23.0 | 20.9 | 2.2 | 19.3 | 14.3 | 22.2 | -4.3 | 18.3 | 5.4 | 10.9 | 24.6 | 23.3 | 19.7 | -1.0 |
| 418 | 0.7 | 5.0 | 19.9 | 11.4 | 15.3 | 9.0 | 8.6 | 20.9 | -7.1 | 18.4 | 6.4 | 14.3 | 16.1 | 18.1 | 14.6 | 4.3 |
| 419 | -1.0 | 19.3 | 9.4 | 21.5 | 19.7 | 21.4 | 9.7 | 8.5 | -2.1 | 13.6 | 1.7 | 7.0 | 7.1 | 11.3 | 9.4 | 1.8 |
| 420 | 2.4 | 23.5 | 14.5 | 5.2 | 18.2 | 19.4 | 22.4 | 0.7 | -14.1 | 12.1 | 20.3 | 3.8 | 12.8 | 6.7 | 15.1 | 0.9 |
| 421 | 4.8 | 8.5 | 8.4 | 14.0 | 24.1 | 23.7 | 0.3 | 14.8 | -11.3 | 17.3 | 22.6 | 4.9 | 13.2 | 18.8 | 12.7 | -3.4 |
| 422 | -3.8 | 15.4 | 9.4 | 16.9 | 15.0 | 23.0 | 20.2 | 2.6 | -1.1 | 24.4 | 12.4 | 13.4 | 8.8 | 13.4 | 17.8 | 2.8 |
| 423 | -4.2 | 11.8 | 7.8 | 20.1 | 23.1 | 8.9 | 18.9 | 9.1 | -0.5 | 23.9 | 18.6 | 2.9 | 1.6 | 8.3 | 9.3 | -4.2 |
| 424 | 2.4 | 5.4 | 17.5 | 12.9 | 12.0 | 21.1 | 1.3 | 21.0 | -2.8 | 24.8 | 14.2 | 19.4 | 3.6 | 11.8 | 17.4 | 3.7 |
| 425 | -3.7 | 6.2 | 9.8 | 9.4 | 20.9 | 4.9 | 6.3 | 12.8 | -2.3 | 19.8 | 1.8 | 9.6 | 16.7 | 14.6 | 6.5 | -1.3 |
| 426 | 1.9 | 25.0 | 18.1 | 13.7 | 13.9 | 16.6 | 3.7 | 19.5 | -4.5 | 22.0 | 12.1 | 10.4 | 1.2 | 23.8 | 20.1 | -0.6 |
| 427 | -1.9 | 20.2 | 14.8 | 14.3 | 13.0 | 19.2 | 3.2 | 12.2 | -14.7 | 20.9 | 4.5 | 21.6 | 4.9 | 9.2 | 7.6 | -0.9 |
| 428 | -4.8 | 15.8 | 13.2 | 12.5 | 4.0 | 19.0 | 0.5 | 15.5 | -9.4 | 14.2 | 15.5 | 5.8 | 13.7 | 16.0 | 18.8 | 4.8 |
| 429 | 3.0 | 17.2 | 14.0 | 19.9 | 15.7 | 21.2 | 15.1 | 7.9 | -0.4 | 21.0 | 23.0 | 9.8 | 21.5 | 16.7 | 16.3 | 3.8 |
| 430 | 2.8 | 17.9 | 10.9 | 15.1 | 6.1 | 0.1 | 13.3 | 12.9 | -9.4 | 3.7 | 24.8 | 5.1 | 22.8 | 10.3 | 19.0 | -1.7 |
| 431 | 1.9 | 8.6 | 22.5 | 18.5 | 11.5 | 1.1 | 10.9 | 2.7 | -4.4 | 24.2 | 5.3 | 12.2 | 6.7 | 7.6 | 22.5 | 0.5 |
| 432 | -2.8 | 9.0 | 12.2 | 20.7 | 8.4 | 1.6 | 4.6 | 21.9 | -6.3 | 3.1 | 17.1 | 17.0 | 12.9 | 22.2 | 6.0 | -1.6 |
| 433 | 1.7 | 9.2 | 15.5 | 17.4 | 12.4 | 18.1 | 13.2 | 5.2 | -8.2 | 8.1 | 22.9 | 1.2 | 23.5 | 9.8 | 21.1 | 0.9 |
| 434 | -4.5 | 8.3 | 24.9 | 8.5 | 10.1 | 13.9 | 16.6 | 10.2 | -6.5 | 6.9 | 8.7 | 24.1 | 6.3 | 24.9 | 5.7 | 0.2 |
| 435 | -1.0 | 23.6 | 17.5 | 14.7 | 15.0 | 10.3 | 13.5 | 12.0 | -1.4 | 13.5 | 2.5 | 18.8 | 8.3 | 20.2 | 19.7 | 1.0 |
| 436 | -2.5 | 8.0 | 8.5 | 7.7 | 18.6 | 24.7 | 19.9 | 17.1 | -10.8 | 5.1 | 13.6 | 4.1 | 8.0 | 7.3 | 20.7 | -4.4 |
| 437 | 3.6 | 13.4 | 22.7 | 18.6 | 16.9 | 9.3 | 18.8 | 18.9 | -5.8 | 21.1 | 18.0 | 9.7 | 11.0 | 6.5 | 8.4 | -0.1 |
| 438 | -0.7 | 13.7 | 13.0 | 15.3 | 8.6 | 16.3 | 6.4 | 2.8 | -6.0 | 18.1 | 10.6 | 14.7 | 4.9 | 8.6 | 5.5 | 4.4 |
| 439 | 0.7 | 14.0 | 23.2 | 8.7 | 14.3 | 22.1 | 1.7 | 6.5 | -11.8 | 23.1 | 24.7 | 15.8 | 17.2 | 13.4 | 14.5 | -4.5 |
| 440 | 0.2 | 14.1 | 21.3 | 8.7 | 21.1 | 13.8 | 15.7 | 2.8 | -9.8 | 22.2 | 20.9 | 1.1 | 11.2 | 7.1 | 19.3 | 2.2 |
| 441 | -2.6 | 21.7 | 13.5 | 11.0 | 6.1 | 22.6 | 2.0 | 7.3 | -12.6 | 13.5 | 14.0 | 7.4 | 22.3 | 15.0 | 14.6 | -2.6 |
| 442 | -4.7 | 7.0 | 14.1 | 16.1 | 15.3 | 17.4 | 9.5 | 23.8 | -6.6 | 20.8 | 5.6 | 20.6 | 8.8 | 15.5 | 16.3 | -2.0 |
| 443 | 2.3 | 11.0 | 8.8 | 16.2 | 22.3 | 4.4 | 14.4 | 19.9 | -6.6 | 0.3 | 24.4 | 11.2 | 11.8 | 12.3 | 11.1 | -1.3 |
| 444 | -1.5 | 21.6 | 10.3 | 5.5 | 21.1 | 1.9 | 1.9 | 10.0 | -4.4 | 11.1 | 8.7 | 14.9 | 2.3 | 8.4 | 10.2 | -3.3 |
| 445 | -4.1 | 19.7 | 10.7 | 6.7 | 6.3 | 5.6 | 4.8 | 23.0 | -2.9 | 17.0 | 20.1 | 18.6 | 14.0 | 8.1 | 22.1 | 3.9 |
| 446 | -3.7 | 6.2 | 11.2 | 10.1 | 9.4 | 10.5 | 14.4 | 13.0 | -14.1 | 21.4 | 3.3 | 21.1 | 7.8 | 9.2 | 15.0 | -4.6 |
| 447 | 2.7 | 5.2 | 15.7 | 19.9 | 2.9 | 0.1 | 3.4 | 6.7 | -9.9 | 3.3 | 22.6 | 15.6 | 14.2 | 10.0 | 17.2 | -1.8 |
| 448 | 0.1 | 8.4 | 7.0 | 15.7 | 2.0 | 24.9 | 20.6 | 6.0 | -11.7 | 0.1 | 19.2 | 13.0 | 5.1 | 23.9 | 18.7 | -4.3 |
| 449 | -3.1 | 12.1 | 24.0 | 15.0 | 8.6 | 2.8 | 17.1 | 8.3 | -0.6 | 21.5 | 8.0 | 12.6 | 8.0 | 16.1 | 19.7 | -4.2 |
| 450 | -3.5 | 15.7 | 21.5 | 13.2 | 18.3 | 2.1 | 10.8 | 2.3 | -3.3 | 7.7 | 7.2 | 21.3 | 7.0 | 22.9 | 10.1 | -4.3 |

valley loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 451 | -1.3 | 16.4 | 16.5 | 16.3 | 10.4 | 0.4 | 23.3 | 16.9 | -3.6 | 11.1 | 9.7 | 0.9 | 11.9 | 11.3 | 23.1 | -1.5 |
| 452 | 3.5 | 16.6 | 13.8 | 19.1 | 11.8 | 16.4 | 11.1 | 16.1 | -2.3 | 8.5 | 2.4 | 14.8 | 8.3 | 10.7 | 7.1 | -2.2 |
| 453 | -4.7 | 22.7 | 20.7 | 10.9 | 14.7 | 16.1 | 11.2 | 14.4 | -10.6 | 22.0 | 5.6 | 2.6 | 5.6 | 20.3 | 13.2 | -2.1 |
| 454 | 5.0 | 24.6 | 22.6 | 16.6 | 6.3 | 3.5 | 13.5 | 23.7 | -10.1 | 4.5 | 16.3 | 3.3 | 22.3 | 9.2 | 24.3 | 3.8 |
| 455 | -3.7 | 21.2 | 11.4 | 11.1 | 21.6 | 13.7 | 13.8 | 9.2 | -12.0 | 20.8 | 17.3 | 25.0 | 16.3 | 7.5 | 20.2 | -0.3 |
| 456 | 4.4 | 6.0 | 16.9 | 24.3 | 10.8 | 5.1 | 6.2 | 18.5 | -8.1 | 3.5 | 3.8 | 9.4 | 17.0 | 18.5 | 8.3 | -1.1 |
| 457 | 0.7 | 23.4 | 15.6 | 21.4 | 11.4 | 18.6 | 2.3 | 9.7 | -14.1 | 23.3 | 3.4 | 2.6 | 15.6 | 22.7 | 23.4 | 2.2 |
| 458 | -1.7 | 13.0 | 9.7 | 15.8 | 7.5 | 20.4 | 21.0 | 3.6 | -12.7 | 3.2 | 5.1 | 0.9 | 17.1 | 6.9 | 14.9 | -0.3 |
| 459 | 4.5 | 8.9 | 11.3 | 13.0 | 6.7 | 21.2 | 10.4 | 10.0 | -5.0 | 9.4 | 5.2 | 22.9 | 20.0 | 20.7 | 22.9 | -4.1 |
| 460 | -4.9 | 11.6 | 8.4 | 22.2 | 2.2 | 21.4 | 12.3 | 21.0 | -7.8 | 23.9 | 10.6 | 14.5 | 7.7 | 24.7 | 19.1 | 4.8 |
| 461 | -0.4 | 17.3 | 5.0 | 17.1 | 16.8 | 5.9 | 22.0 | 7.8 | -10.2 | 22.8 | 2.8 | 4.1 | 0.4 | 5.3 | 6.7 | -4.6 |
| 462 | 4.9 | 15.1 | 11.9 | 11.5 | 13.4 | 13.9 | 11.9 | 13.3 | -0.8 | 2.7 | 10.9 | 3.5 | 7.8 | 19.7 | 14.4 | 4.6 |
| 463 | -3.3 | 18.9 | 19.8 | 21.7 | 9.8 | 2.3 | 8.5 | 10.9 | -11.5 | 18.4 | 14.2 | 24.6 | 24.7 | 23.8 | 12.9 | 3.5 |
| 464 | 0.5 | 7.9 | 14.0 | 7.7 | 10.6 | 14.4 | 3.5 | 20.5 | -2.2 | 9.2 | 15.5 | 14.2 | 12.3 | 9.5 | 22.6 | -3.2 |
| 465 | -4.5 | 17.6 | 17.2 | 8.4 | 4.5 | 6.4 | 5.4 | 0.8 | -1.9 | 7.1 | 24.6 | 2.1 | 7.9 | 16.5 | 12.9 | 5.0 |
| 466 | -0.5 | 18.7 | 6.6 | 7.1 | 1.3 | 16.2 | 12.8 | 2.2 | -13.3 | 5.2 | 23.1 | 9.9 | 3.9 | 18.5 | 17.4 | -3.2 |
| 467 | 2.2 | 24.9 | 7.6 | 16.5 | 11.7 | 8.1 | 7.4 | 25.0 | -1.5 | 22.2 | 5.4 | 22.6 | 12.4 | 20.7 | 6.0 | 4.0 |
| 468 | -2.1 | 5.5 | 6.3 | 23.3 | 10.8 | 0.8 | 18.5 | 14.9 | -13.2 | 1.4 | 19.5 | 4.5 | 21.3 | 8.1 | 15.5 | -0.9 |
| 469 | 2.9 | 20.9 | 5.8 | 9.3 | 19.5 | 20.9 | 15.0 | 18.4 | -14.5 | 7.1 | 19.6 | 5.6 | 8.1 | 5.7 | 18.7 | 0.3 |
| 470 | 2.0 | 8.4 | 19.1 | 22.1 | 2.4 | 2.2 | 15.3 | 15.3 | -4.1 | 9.7 | 17.3 | 14.5 | 21.9 | 14.1 | 12.0 | 4.9 |
| 471 | 0.5 | 7.4 | 21.6 | 8.6 | 8.0 | 9.9 | 12.5 | 1.8 | -14.8 | 16.7 | 14.4 | 22.0 | 18.6 | 21.3 | 14.3 | 2.3 |
| 472 | -1.5 | 14.6 | 24.7 | 22.9 | 13.9 | 14.2 | 17.2 | 21.0 | -8.3 | 18.1 | 10.1 | 15.3 | 17.4 | 16.0 | 17.7 | -3.6 |
| 473 | -1.7 | 8.0 | 14.0 | 6.3 | 5.5 | 15.6 | 3.4 | 17.2 | -0.5 | 17.2 | 4.5 | 8.6 | 21.2 | 6.8 | 8.4 | 2.1 |
| 474 | 3.3 | 24.9 | 14.1 | 19.9 | 15.4 | 14.3 | 9.8 | 22.7 | -1.1 | 8.8 | 12.1 | 7.0 | 12.4 | 14.1 | 17.6 | -1.3 |
| 475 | 2.9 | 15.6 | 16.4 | 5.6 | 12.2 | 13.6 | 16.9 | 10.4 | -4.4 | 0.7 | 20.0 | 13.3 | 23.0 | 15.7 | 5.8 | 4.7 |
| 476 | -0.7 | 14.3 | 10.1 | 24.8 | 24.3 | 20.9 | 11.1 | 0.5 | -4.0 | 18.8 | 0.6 | 20.3 | 22.1 | 16.7 | 20.8 | 1.7 |
| 477 | 1.4 | 17.3 | 7.6 | 11.0 | 8.1 | 4.8 | 13.4 | 19.6 | -9.1 | 6.8 | 12.0 | 15.1 | 2.9 | 17.8 | 5.3 | -2.8 |
| 478 | -3.7 | 12.6 | 15.6 | 9.5 | 13.4 | 20.3 | 13.5 | 8.3 | -0.1 | 0.3 | 24.2 | 7.4 | 22.2 | 22.2 | 24.3 | -2.5 |
| 479 | -1.2 | 18.9 | 7.3 | 12.1 | 0.2 | 12.3 | 4.7 | 2.1 | -10.6 | 1.8 | 12.6 | 23.5 | 4.3 | 22.1 | 17.3 | -2.9 |
| 480 | -4.5 | 16.5 | 14.7 | 21.0 | 9.0 | 14.4 | 3.3 | 4.2 | -12.3 | 22.4 | 0.4 | 8.4 | 21.5 | 13.1 | 22.3 | 2.1 |
| 481 | 0.4 | 22.2 | 23.5 | 8.8 | 8.6 | 16.4 | 4.6 | 9.3 | -5.0 | 22.4 | 17.6 | 1.5 | 23.1 | 21.5 | 15.6 | 2.6 |
| 482 | 2.9 | 10.0 | 21.3 | 20.1 | 0.9 | 9.5 | 10.0 | 1.2 | -10.0 | 15.0 | 13.0 | 6.9 | 2.3 | 13.4 | 10.2 | -1.7 |
| 483 | 4.9 | 11.8 | 13.8 | 18.7 | 9.7 | 22.0 | 12.2 | 0.2 | -6.2 | 3.5 | 5.0 | 9.6 | 19.9 | 10.1 | 8.5 | 0.3 |
| 484 | -4.5 | 16.6 | 15.8 | 7.2 | 11.4 | 16.6 | 8.8 | 0.1 | -1.5 | 3.1 | 6.0 | 20.5 | 8.6 | 18.0 | 22.5 | -2.8 |
| 485 | -4.1 | 23.2 | 5.8 | 17.2 | 19.0 | 16.7 | 9.6 | 22.4 | -7.8 | 15.6 | 24.9 | 15.4 | 11.7 | 19.9 | 11.2 | -3.1 |
| 486 | -0.8 | 24.0 | 24.5 | 13.8 | 6.0 | 24.1 | 1.5 | 0.1 | -8.0 | 6.6 | 19.8 | 3.9 | 5.2 | 14.5 | 14.1 | 2.8 |
| 487 | -1.0 | 8.4 | 7.0 | 18.3 | 17.7 | 0.5 | 6.4 | 16.1 | -1.6 | 18.5 | 2.0 | 17.3 | 14.8 | 10.6 | 19.6 | 3.8 |
| 488 | 0.4 | 13.1 | 16.1 | 16.6 | 7.7 | 16.2 | 13.0 | 16.0 | -2.7 | 16.1 | 20.5 | 6.1 | 6.0 | 21.9 | 10.7 | 1.1 |
| 489 | 0.8 | 21.9 | 5.6 | 8.4 | 13.8 | 7.4 | 6.2 | 10.1 | -6.3 | 20.3 | 3.1 | 4.5 | 22.3 | 12.2 | 14.3 | 3.9 |
| 490 | -4.3 | 9.0 | 13.2 | 6.5 | 2.1 | 21.0 | 21.7 | 23.8 | -11.4 | 2.5 | 10.4 | 19.5 | 4.6 | 11.5 | 17.8 | 2.8 |
| 491 | 2.4 | 10.8 | 10.5 | 19.6 | 7.1 | 11.5 | 12.0 | 12.8 | -9.3 | 6.9 | 21.1 | 21.4 | 7.8 | 12.9 | 21.8 | 4.0 |
| 492 | -4.4 | 9.5 | 12.0 | 8.8 | 12.8 | 24.0 | 1.3 | 16.7 | -7.2 | 21.2 | 2.3 | 7.8 | 1.2 | 24.5 | 6.9 | -2.6 |
| 493 | 2.9 | 24.3 | 12.7 | 18.0 | 14.0 | 21.6 | 9.2 | 19.9 | -7.1 | 0.5 | 7.9 | 13.8 | 14.5 | 24.2 | 16.9 | -1.2 |
| 494 | 0.0 | 17.9 | 9.3 | 6.8 | 3.1 | 7.8 | 6.2 | 15.9 | -8.5 | 24.5 | 14.7 | 17.9 | 7.1 | 24.4 | 10.6 | -2.1 |
| 495 | 2.0 | 14.4 | 13.7 | 12.6 | 4.3 | 3.4 | 16.6 | 14.7 | -13.6 | 21.6 | 8.1 | 23.9 | 13.3 | 10.4 | 8.3 | 3.5 |
| 496 | 4.4 | 15.8 | 22.9 | 20.0 | 17.3 | 8.7 | 19.6 | 13.2 | -0.3 | 20.9 | 7.5 | 4.7 | 0.5 | 10.0 | 14.4 | -3.0 |
| 497 | 4.2 | 20.7 | 21.8 | 23.3 | 13.2 | 3.3 | 17.6 | 1.5 | -0.3 | 1.6 | 23.6 | 4.8 | 2.9 | 11.3 | 21.1 | 1.3 |
| 498 | -3.4 | 10.8 | 6.2 | 13.0 | 20.2 | 22.9 | 5.1 | 16.1 | -8.7 | 9.7 | 11.9 | 23.6 | 14.0 | 16.4 | 5.7 | -4.2 |
| 499 | 3.1 | 15.6 | 17.3 | 24.2 | 2.6 | 10.8 | 16.0 | 16.6 | -1.7 | 21.6 | 4.1 | 3.6 | 3.2 | 12.3 | 17.1 | 1.8 |
| 500 | 3.2 | 20.7 | 12.7 | 9.9 | 0.1 | 17.5 | 12.8 | 14.8 | -13.9 | 8.3 | 3.8 | 8.8 | 0.4 | 24.1 | 20.8 | -4.6 |
| 501 | -0.6 | 5.5 | 14.0 | 9.2 | 16.0 | 14.1 | 0.3 | 24.9 | -8.8 | 11.7 | 6.7 | 20.9 | 23.6 | 19.8 | 13.3 | -3.7 |
| 502 | 3.2 | 24.4 | 20.7 | 19.6 | 17.2 | 3.5 | 3.4 | 8.0 | -8.8 | 21.6 | 14.9 | 18.2 | 7.4 | 22.4 | 18.3 | 4.3 |
| 503 | -4.3 | 9.6 | 6.2 | 5.5 | 24.1 | 0.1 | 17.3 | 22.9 | -0.4 | 15.7 | 2.8 | 12.4 | 1.7 | 5.2 | 23.1 | 3.8 |
| 504 | -0.3 | 20.9 | 10.0 | 16.5 | 14.0 | 4.5 | 9.3 | 7.7 | -11.0 | 16.3 | 23.7 | 4.9 | 8.1 | 9.7 | 23.0 | -1.3 |
| 505 | -4.0 | 24.1 | 19.8 | 16.9 | 19.8 | 9.2 | 13.0 | 21.7 | -9.3 | 8.5 | 21.6 | 17.0 | 3.0 | 21.3 | 14.0 | -2.0 |
| 506 | 0.3 | 10.2 | 22.8 | 19.7 | 15.5 | 6.2 | 22.4 | 7.1 | -10.1 | 24.6 | 2.5 | 24.5 | 23.6 | 12.7 | 7.2 | 3.8 |
| 507 | 4.3 | 24.7 | 24.3 | 17.6 | 6.9 | 7.1 | 6.8 | 19.4 | -12.2 | 2.4 | 1.1 | 15.4 | 5.2 | 19.4 | 6.4 | 4.4 |
| 508 | 0.5 | 12.0 | 12.8 | 13.7 | 11.0 | 16.6 | 17.7 | 17.3 | -12.2 | 11.0 | 7.0 | 1.0 | 16.3 | 13.8 | 23.7 | 4.1 |
| 509 | -2.7 | 19.9 | 21.6 | 16.5 | 12.5 | 11.4 | 15.1 | 12.3 | -2.3 | 1.5 | 2.4 | 19.7 | 21.5 | 7.6 | 22.4 | -0.5 |
| 510 | 3.4 | 24.5 | 12.5 | 10.8 | 13.7 | 11.1 | 5.1 | 16.0 | -12.4 | 17.8 | 23.1 | 8.9 | 21.7 | 13.6 | 17.3 | -0.5 |
| 511 | -4.1 | 15.4 | 10.7 | 9.1 | 12.4 | 17.3 | 18.0 | 9.4 | -14.9 | 8.3 | 17.6 | 12.6 | 8.3 | 15.4 | 19.8 | 3.8 |
| 512 | 3.4 | 24.4 | 9.9 | 13.9 | 13.1 | 25.0 | 15.7 | 18.9 | -3.9 | 8.4 | 1.3 | 2.5 | 19.7 | 23.6 | 19.7 | 2.2 |
| 513 | 0.7 | 13.4 | 6.5 | 24.4 | 10.9 | 16.3 | 22.2 | 8.4 | -7.2 | 11.7 | 13.7 | 16.2 | 0.3 | 14.1 | 24.0 | 3.7 |
| 514 | -1.9 | 12.9 | 9.3 | 21.8 | 7.6 | 21.4 | 10.8 | 17.1 | -14.3 | 2.5 | 15.2 | 0.6 | 2.5 | 10.7 | 23.7 | 4.7 |
| 515 | -2.7 | 18.2 | 23.8 | 23.3 | 24.9 | 9.4 | 11.5 | 14.9 | -8.3 | 22.5 | 21.5 | 20.7 | 23.0 | 17.6 | 20.9 | 2.0 |
| 516 | -3.6 | 22.3 | 9.4 | 22.6 | 5.5 | 23.7 | 17.0 | 19.9 | -10.8 | 7.1 | 15.7 | 14.5 | 11.0 | 13.6 | 23.7 | -0.9 |
| 517 | 3.0 | 24.6 | 20.6 | 11.5 | 14.9 | 23.1 | 21.5 | 22.3 | -3.6 | 18.0 | 20.9 | 11.9 | 0.5 | 18.3 | 22.6 | 3.3 |
| 518 | 2.9 | 12.8 | 18.9 | 22.5 | 23.8 | 17.7 | 19.6 | 20.2 | -9.8 | 9.2 | 8.1 | 9.1 | 4.5 | 14.7 | 16.2 | -2.1 |
| 519 | 0.2 | 17.1 | 6.1 | 9.2 | 7.7 | 15.0 | 21.5 | 16.2 | -9.2 | 10.0 | 5.9 | 3.1 | 18.2 | 20.4 | 20.8 | 2.7 |
| 520 | 1.5 | 8.1 | 23.6 | 10.0 | 16.6 | 5.6 | 18.1 | 19.9 | -12.1 | 24.3 | 23.3 | 13.9 | 8.5 | 19.5 | 6.7 | -2.8 |
| 521 | -2.4 | 18.2 | 21.0 | 9.3 | 21.6 | 12.3 | 10.6 | 7.0 | -11.3 | 14.0 | 19.2 | 19.3 | 24.7 | 17.1 | 6.7 | -3.6 |
| 522 | 3.0 | 15.2 | 20.1 | 22.3 | 23.3 | 11.1 | 9.2 | 12.7 | -6.9 | 21.3 | 24.2 | 9.2 | 12.2 | 8.6 | 15.3 | 3.7 |
| 523 | 1.2 | 7.2 | 5.8 | 23.7 | 6.9 | 9.3 | 20.7 | 18.8 | -8.7 | 20.2 | 18.5 | 6.8 | 14.9 | 18.8 | 19.7 | -2.6 |
| 524 | -0.2 | 14.8 | 6.0 | 22.6 | 14.9 | 21.6 | 10.2 | 7.8 | -14.0 | 8.6 | 24.0 | 19.7 | 6.8 | 8.3 | 8.5 | 4.1 |
| 525 | -0.6 | 9.3 | 15.3 | 23.1 | 8.6 | 11.1 | 8.8 | 16.9 | -3.8 | 23.0 | 7.2 | 22.7 | 23.2 | 19.0 | 16.6 | -0.5 |

valley loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 526 | 2.7 | 16.0 | 14.2 | 22.8 | 20.3 | 11.0 | 12.7 | 13.8 | -3.4 | 21.3 | 14.3 | 17.1 | 21.3 | 17.7 | 7.6 | -0.1 |
| 527 | 4.9 | 21.9 | 21.7 | 10.0 | 19.0 | 19.2 | 16.0 | 23.5 | -11.4 | 6.8 | 22.8 | 23.6 | 7.9 | 8.4 | 6.1 | -4.8 |
| 528 | 2.2 | 14.5 | 14.0 | 11.7 | 24.8 | 20.7 | 17.9 | 13.9 | -7.3 | 20.1 | 22.6 | 13.0 | 22.3 | 11.0 | 21.6 | 3.9 |
| 529 | -2.4 | 21.2 | 8.7 | 8.8 | 8.9 | 19.5 | 10.0 | 21.7 | -1.5 | 16.0 | 16.6 | 24.0 | 6.4 | 17.6 | 20.5 | 3.3 |
| 530 | -3.2 | 17.6 | 11.2 | 12.8 | 20.2 | 13.3 | 12.5 | 5.4 | -14.4 | 10.9 | 10.8 | 18.8 | 13.2 | 9.2 | 19.9 | 4.5 |
| 531 | -3.1 | 18.0 | 17.5 | 12.2 | 24.0 | 5.9 | 17.1 | 20.0 | -7.5 | 12.6 | 13.9 | 15.0 | 20.6 | 7.1 | 23.6 | 2.4 |
| 532 | 4.9 | 16.3 | 7.4 | 23.9 | 14.2 | 13.9 | 7.9 | 23.9 | -0.3 | 22.1 | 12.8 | 19.8 | 17.7 | 16.5 | 14.3 | 0.9 |
| 533 | -5.0 | 17.8 | 24.6 | 18.7 | 22.0 | 5.2 | 5.1 | 18.0 | -10.4 | 13.4 | 17.6 | 24.9 | 22.6 | 9.7 | 24.6 | -1.1 |
| 534 | 3.1 | 13.6 | 23.5 | 23.1 | 9.2 | 8.6 | 19.5 | 9.3 | -13.5 | 19.7 | 11.7 | 21.9 | 22.8 | 14.9 | 13.9 | -3.1 |
| 535 | 3.3 | 13.7 | 11.4 | 23.3 | 7.5 | 10.7 | 10.7 | 20.7 | -5.7 | 13.8 | 16.8 | 22.3 | 7.0 | 17.2 | 7.9 | -0.7 |
| 536 | 1.7 | 9.3 | 24.7 | 22.2 | 23.7 | 12.5 | 9.4 | 7.7 | -7.6 | 8.3 | 15.0 | 16.1 | 20.3 | 19.5 | 15.2 | -2.3 |
| 537 | 3.9 | 14.1 | 20.2 | 20.2 | 20.9 | 9.7 | 9.6 | 14.6 | -10.4 | 16.1 | 6.5 | 21.6 | 17.2 | 7.5 | 12.8 | 0.7 |
| 538 | -1.9 | 12.2 | 16.3 | 15.9 | 13.8 | 9.9 | 18.5 | 25.0 | -6.7 | 8.4 | 17.4 | 13.9 | 10.5 | 14.1 | 9.5 | -1.3 |
| 539 | -1.4 | 19.1 | 18.1 | 7.4 | 14.6 | 9.3 | 7.1 | 22.1 | -14.3 | 14.2 | 20.2 | 13.3 | 6.2 | 12.7 | 16.4 | 2.8 |
| 540 | -3.4 | 24.3 | 18.1 | 8.9 | 20.6 | 17.9 | 19.7 | 20.8 | -14.0 | 9.8 | 13.4 | 19.9 | 21.0 | 16.7 | 24.2 | 2.3 |
| 541 | 2.3 | 8.8 | 24.1 | 16.3 | 21.0 | 18.6 | 10.8 | 11.9 | -10.5 | 18.1 | 24.7 | 15.8 | 24.6 | 19.9 | 12.2 | -1.4 |
| 542 | -0.6 | 21.7 | 10.7 | 18.3 | 14.0 | 8.2 | 17.9 | 6.0 | -4.2 | 18.8 | 20.1 | 19.4 | 14.7 | 7.1 | 17.8 | 0.6 |
| 543 | 4.5 | 6.3 | 11.9 | 16.8 | 21.7 | 14.0 | 7.0 | 7.5 | -5.5 | 9.5 | 5.8 | 9.5 | 8.0 | 13.8 | 22.0 | -0.8 |
| 544 | 2.5 | 10.7 | 18.1 | 21.8 | 13.9 | 17.6 | 20.1 | 22.1 | -6.5 | 11.3 | 6.7 | 8.8 | 21.7 | 7.6 | 16.9 | 4.2 |
| 545 | 1.2 | 12.1 | 23.7 | 20.1 | 17.5 | 6.8 | 24.9 | 22.7 | -5.8 | 22.7 | 8.8 | 16.4 | 10.7 | 6.0 | 6.1 | -4.7 |
| 546 | -1.8 | 8.5 | 16.0 | 23.6 | 6.4 | 12.9 | 16.7 | 23.2 | -5.2 | 20.3 | 10.1 | 6.0 | 10.4 | 14.8 | 22.9 | -2.6 |
| 547 | -2.0 | 24.9 | 13.8 | 15.7 | 23.4 | 17.4 | 18.2 | 5.3 | -9.7 | 5.4 | 13.4 | 20.0 | 18.6 | 19.9 | 15.1 | -4.5 |
| 548 | 4.3 | 19.1 | 8.2 | 17.5 | 8.0 | 9.0 | 14.8 | 13.8 | -1.4 | 5.4 | 7.9 | 13.0 | 16.5 | 18.6 | 21.1 | -3.7 |
| 549 | -2.3 | 14.3 | 21.5 | 14.9 | 8.5 | 11.8 | 18.8 | 8.6 | -8.5 | 18.6 | 16.7 | 22.5 | 13.7 | 13.7 | 13.1 | 3.7 |
| 550 | -3.1 | 14.4 | 24.6 | 13.8 | 17.9 | 12.1 | 9.0 | 8.0 | -0.1 | 14.4 | 24.6 | 14.3 | 9.7 | 19.2 | 7.5 | -5.0 |
| 551 | -2.4 | 7.4 | 20.2 | 16.1 | 20.3 | 6.6 | 7.6 | 9.1 | -14.4 | 22.6 | 12.7 | 19.9 | 11.6 | 21.8 | 24.6 | -3.0 |
| 552 | 1.1 | 17.7 | 8.9 | 16.8 | 13.7 | 18.4 | 9.1 | 5.2 | -3.9 | 9.5 | 18.6 | 21.0 | 9.1 | 17.0 | 21.8 | -3.5 |
| 553 | -2.9 | 7.0 | 20.8 | 9.8 | 19.7 | 6.3 | 8.9 | 10.0 | -10.4 | 8.6 | 18.7 | 13.7 | 23.1 | 11.3 | 24.7 | 4.3 |
| 554 | -4.1 | 18.8 | 13.3 | 21.0 | 24.6 | 24.4 | 13.8 | 19.9 | -14.9 | 15.6 | 18.1 | 24.6 | 17.8 | 18.0 | 23.8 | 0.0 |
| 555 | -3.7 | 15.2 | 21.0 | 19.3 | 8.2 | 20.1 | 17.6 | 11.7 | -8.2 | 22.6 | 16.3 | 10.8 | 8.4 | 16.0 | 8.8 | 1.7 |
| 556 | -2.0 | 12.6 | 8.4 | 7.7 | 6.7 | 13.8 | 6.0 | 11.0 | -1.1 | 20.9 | 12.2 | 21.5 | 21.4 | 8.0 | 14.3 | -1.9 |
| 557 | -3.3 | 15.9 | 14.8 | 20.1 | 11.2 | 17.9 | 12.0 | 24.7 | -0.8 | 23.3 | 10.3 | 8.8 | 25.0 | 6.0 | 19.4 | -0.8 |
| 558 | 2.7 | 15.5 | 11.4 | 18.8 | 5.7 | 14.7 | 23.6 | 17.6 | -0.4 | 7.0 | 9.0 | 6.4 | 19.9 | 14.4 | 21.4 | 1.9 |
| 559 | -0.3 | 19.0 | 8.5 | 24.5 | 5.7 | 9.4 | 12.3 | 10.0 | -6.0 | 10.4 | 15.2 | 6.4 | 17.4 | 7.4 | 24.7 | 3.3 |
| 560 | -1.0 | 8.4 | 17.1 | 16.4 | 8.3 | 22.2 | 6.0 | 14.5 | -8.3 | 19.8 | 5.6 | 13.4 | 22.6 | 21.9 | 21.9 | 0.2 |
| 561 | 0.5 | 5.7 | 20.7 | 17.9 | 6.5 | 18.3 | 10.6 | 22.6 | -13.4 | 23.9 | 15.4 | 14.9 | 19.1 | 18.9 | 10.9 | -2.4 |
| 562 | -2.8 | 13.2 | 19.2 | 21.7 | 14.9 | 5.0 | 11.7 | 18.0 | -5.2 | 9.8 | 17.2 | 23.1 | 11.2 | 21.1 | 20.0 | -0.1 |
| 563 | -1.3 | 20.6 | 14.9 | 11.5 | 5.5 | 5.9 | 13.6 | 18.9 | -13.7 | 21.8 | 19.4 | 23.1 | 12.2 | 7.6 | 15.2 | -3.9 |
| 564 | 0.4 | 13.3 | 14.9 | 23.8 | 22.2 | 11.7 | 9.4 | 10.8 | -8.3 | 9.7 | 15.2 | 20.9 | 23.0 | 9.4 | 8.3 | 1.0 |
| 565 | 2.3 | 18.8 | 18.7 | 15.5 | 24.1 | 13.2 | 19.0 | 20.2 | -5.1 | 23.4 | 21.4 | 21.7 | 10.2 | 11.2 | 15.1 | 0.5 |
| 566 | 2.0 | 16.7 | 17.2 | 22.8 | 7.3 | 7.1 | 10.8 | 11.6 | -14.4 | 21.6 | 19.2 | 18.1 | 17.0 | 14.2 | 13.7 | 2.0 |
| 567 | -2.9 | 5.6 | 8.8 | 5.4 | 18.6 | 14.2 | 8.2 | 11.7 | -6.6 | 12.0 | 10.7 | 10.3 | 19.1 | 15.0 | 10.7 | 4.2 |
| 568 | 1.2 | 15.0 | 16.4 | 6.6 | 19.5 | 12.7 | 17.5 | 17.5 | -6.2 | 24.9 | 14.6 | 7.3 | 20.9 | 18.4 | 23.6 | 4.9 |
| 569 | -1.1 | 21.0 | 6.8 | 23.8 | 12.3 | 22.7 | 6.4 | 23.2 | -13.4 | 6.4 | 13.1 | 20.9 | 7.6 | 10.3 | 15.8 | 3.0 |
| 570 | 2.2 | 15.9 | 10.7 | 10.5 | 9.5 | 21.7 | 5.8 | 22.2 | -1.3 | 19.9 | 5.2 | 18.5 | 20.4 | 21.4 | 22.5 | -0.9 |
| 571 | 4.4 | 17.5 | 9.1 | 23.0 | 19.7 | 18.8 | 22.4 | 23.7 | -12.2 | 14.4 | 14.4 | 18.4 | 19.5 | 6.1 | 6.4 | 4.5 |
| 572 | 4.2 | 16.5 | 7.9 | 7.2 | 7.4 | 11.8 | 24.8 | 23.9 | -5.6 | 8.6 | 18.4 | 8.5 | 13.6 | 21.2 | 5.6 | 3.6 |
| 573 | 0.4 | 12.1 | 18.8 | 5.7 | 7.9 | 7.6 | 12.6 | 14.1 | -9.0 | 11.4 | 15.3 | 23.0 | 6.3 | 8.2 | 18.3 | 4.4 |
| 574 | -1.3 | 8.4 | 5.2 | 7.3 | 9.6 | 9.6 | 10.6 | 14.8 | -1.0 | 22.2 | 13.1 | 25.0 | 13.9 | 24.1 | 11.4 | -2.5 |
| 575 | -4.6 | 23.9 | 15.5 | 23.8 | 21.2 | 5.8 | 9.7 | 5.6 | -10.2 | 13.2 | 17.2 | 14.5 | 11.6 | 9.5 | 24.8 | 4.7 |
| 576 | 3.8 | 12.6 | 14.6 | 11.6 | 9.3 | 20.5 | 8.0 | 10.0 | -14.2 | 14.7 | 24.3 | 19.8 | 21.8 | 19.7 | 24.7 | 4.5 |
| 577 | -2.4 | 19.5 | 16.7 | 10.0 | 18.7 | 19.3 | 6.5 | 18.8 | -6.4 | 16.2 | 15.7 | 16.7 | 5.4 | 11.4 | 6.6 | 4.1 |
| 578 | 3.5 | 21.6 | 21.9 | 24.1 | 23.6 | 18.8 | 8.8 | 8.6 | -15.0 | 21.7 | 6.3 | 24.7 | 6.2 | 7.0 | 22.4 | -1.0 |
| 579 | 0.7 | 21.0 | 21.3 | 11.8 | 7.2 | 19.4 | 23.8 | 21.2 | -4.2 | 16.9 | 22.1 | 11.9 | 9.8 | 23.8 | 10.5 | 4.0 |
| 580 | -0.7 | 17.5 | 7.2 | 10.3 | 12.0 | 5.4 | 10.7 | 17.8 | -12.3 | 14.1 | 13.7 | 8.2 | 22.5 | 23.8 | 16.7 | -3.8 |
| 581 | -0.6 | 12.1 | 14.3 | 12.7 | 22.9 | 7.8 | 6.5 | 9.8 | -14.8 | 10.6 | 6.6 | 7.6 | 18.5 | 18.5 | 19.7 | -3.1 |
| 582 | -1.4 | 11.3 | 21.7 | 9.4 | 13.2 | 12.5 | 15.7 | 9.1 | -14.2 | 16.0 | 9.9 | 19.1 | 14.3 | 14.8 | 14.8 | -0.1 |
| 583 | 4.4 | 21.4 | 22.4 | 18.7 | 23.3 | 21.8 | 8.6 | 24.5 | -4.3 | 23.3 | 12.3 | 13.6 | 15.7 | 20.7 | 8.5 | -2.6 |
| 584 | -0.6 | 5.7 | 6.8 | 18.0 | 19.5 | 14.9 | 5.8 | 25.0 | -6.4 | 15.5 | 23.2 | 10.3 | 6.5 | 16.4 | 21.3 | -1.1 |
| 585 | -2.5 | 24.6 | 21.9 | 7.4 | 12.8 | 19.4 | 9.9 | 12.4 | -10.7 | 5.2 | 22.9 | 21.0 | 20.0 | 20.5 | 10.4 | 0.7 |
| 586 | 1.1 | 17.4 | 6.8 | 18.3 | 9.2 | 24.7 | 10.4 | 9.6 | -3.7 | 19.8 | 5.4 | 13.4 | 12.9 | 16.3 | 5.9 | -5.0 |
| 587 | -4.6 | 8.5 | 23.8 | 8.0 | 16.2 | 7.4 | 24.8 | 9.5 | -7.1 | 15.3 | 7.4 | 14.0 | 26.1 | 9.2 | 21.8 | 0.2 |
| 588 | -4.9 | 6.4 | 14.1 | 5.2 | 5.3 | 24.7 | 22.9 | 14.2 | -10.5 | 12.6 | 10.4 | 18.7 | 8.5 | 24.9 | 20.4 | -1.6 |
| 589 | -0.7 | 11.2 | 15.3 | 15.5 | 14.3 | 23.6 | 19.2 | 17.0 | -14.3 | 10.8 | 6.0 | 14.2 | 13.1 | 24.3 | 13.6 | -0.4 |
| 590 | 2.3 | 6.7 | 15.2 | 24.1 | 9.8 | 6.6 | 23.2 | 16.4 | -9.9 | 23.8 | 20.0 | 16.3 | 6.1 | 22.7 | 24.2 | -4.5 |
| 591 | -4.9 | 5.7 | 10.7 | 23.8 | 9.6 | 10.9 | 24.1 | 13.6 | -6.4 | 22.2 | 14.8 | 21.7 | 12.0 | 16.1 | 9.6 | 0.3 |
| 592 | -0.2 | 6.3 | 9.9 | 20.7 | 13.4 | 17.2 | 12.1 | 21.7 | -0.1 | 20.9 | 24.8 | 15.7 | 22.0 | 8.0 | 14.3 | 0.6 |
| 593 | 3.5 | 19.1 | 9.4 | 7.9 | 8.6 | 7.4 | 24.2 | 12.7 | -8.6 | 7.4 | 16.3 | 10.5 | 13.7 | 6.0 | 24.4 | 3.5 |
| 594 | -2.6 | 21.3 | 19.7 | 5.6 | 18.9 | 24.6 | 12.0 | 12.5 | -9.5 | 11.0 | 16.0 | 12.9 | 16.5 | 6.6 | 20.6 | 0.4 |
| 595 | -3.6 | 18.9 | 12.4 | 22.4 | 23.2 | 20.3 | 23.2 | 7.2 | -6.1 | 15.0 | 12.5 | 5.7 | 5.5 | 13.9 | 17.5 | 3.7 |
| 596 | -2.1 | 18.3 | 6.2 | 24.4 | 15.0 | 12.9 | 24.5 | 14.7 | -13.5 | 9.8 | 13.8 | 17.4 | 8.2 | 22.6 | 19.1 | 4.6 |
| 597 | -3.4 | 9.0 | 6.8 | 19.2 | 13.9 | 11.1 | 20.0 | 8.6 | -6.7 | 7.2 | 9.9 | 17.9 | 17.3 | 10.3 | 14.6 | 4.5 |
| 598 | 1.6 | 11.1 | 10.1 | 6.5 | 21.1 | 22.1 | 20.7 | 17.5 | -13.0 | 10.5 | 21.8 | 24.9 | 18.0 | 17.7 | 20.7 | -3.6 |
| 599 | 2.2 | 16.1 | 24.6 | 6.6 | 5.7 | 7.1 | 8.9 | 21.9 | -8.0 | 24.7 | 17.1 | 16.0 | 10.7 | 14.1 | 18.8 | 2.7 |
| 600 | -1.2 | 19.6 | 6.2 | 8.3 | 20.6 | 8.5 | 20.0 | 22.5 | -2.8 | 21.6 | 7.6 | 12.0 | 14.3 | 11.5 | 17.3 | -1.6 |

valley loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 601 | -0.2 | 21.9 | 13.7 | 19.0 | 7.8 | 5.7 | 18.4 | 5.7 | -2.5 | 7.1 | 15.9 | 13.7 | 10.7 | 10.1 | 15.9 | -0.7 |
| 602 | 2.4 | 23.5 | 24.6 | 11.6 | 22.5 | 13.1 | 17.5 | 20.5 | -9.2 | 24.6 | 14.4 | 14.5 | 16.6 | 18.6 | 19.1 | 1.5 |
| 603 | -1.3 | 9.7 | 10.5 | 10.4 | 5.9 | 20.3 | 19.4 | 16.4 | -9.9 | 10.8 | 11.7 | 16.7 | 17.8 | 11.1 | 9.8 | -4.9 |
| 604 | 3.3 | 10.0 | 10.9 | 23.7 | 15.7 | 14.1 | 11.1 | 12.2 | -13.4 | 9.2 | 24.2 | 16.0 | 9.1 | 18.1 | 16.2 | 1.7 |
| 605 | -3.5 | 20.8 | 9.4 | 17.5 | 16.5 | 15.0 | 22.6 | 12.6 | -3.1 | 12.3 | 9.5 | 8.2 | 20.0 | 18.3 | 14.5 | 1.9 |
| 606 | 4.2 | 11.7 | 23.9 | 9.9 | 23.8 | 22.1 | 22.6 | 23.9 | -11.5 | 24.0 | 15.0 | 8.5 | 23.9 | 14.0 | 11.7 | 3.3 |
| 607 | 1.9 | 10.4 | 7.5 | 25.0 | 8.7 | 19.8 | 22.3 | 23.8 | -14.4 | 13.2 | 16.2 | 18.2 | 18.8 | 20.2 | 8.8 | -4.3 |
| 608 | -2.6 | 24.7 | 13.4 | 20.4 | 10.4 | 21.3 | 20.0 | 8.6 | -1.4 | 15.5 | 15.3 | 9.1 | 16.8 | 9.7 | 10.6 | -1.2 |
| 609 | 4.0 | 10.0 | 8.7 | 20.8 | 18.3 | 24.6 | 7.6 | 9.7 | -3.4 | 6.5 | 20.9 | 8.3 | 19.0 | 12.2 | 11.3 | 4.1 |
| 610 | 2.6 | 19.4 | 14.4 | 21.6 | 7.6 | 13.7 | 10.2 | 5.2 | -13.6 | 8.4 | 15.6 | 24.9 | 11.4 | 7.7 | 22.2 | -2.7 |
| 611 | 0.9 | 19.7 | 15.4 | 23.4 | 16.1 | 8.9 | 16.5 | 19.5 | -13.6 | 18.5 | 6.8 | 7.2 | 16.7 | 14.3 | 8.9 | -0.6 |
| 612 | 3.3 | 14.6 | 22.9 | 15.9 | 5.5 | 19.6 | 20.5 | 23.4 | -9.4 | 10.4 | 19.9 | 22.0 | 17.7 | 24.1 | 7.8 | -3.3 |
| 613 | 3.9 | 16.2 | 16.5 | 13.8 | 23.4 | 9.4 | 8.0 | 22.9 | -2.1 | 18.1 | 6.9 | 9.0 | 11.2 | 8.5 | 18.6 | 2.4 |
| 614 | -0.9 | 20.5 | 19.4 | 16.1 | 23.9 | 23.6 | 12.9 | 11.8 | -12.9 | 8.0 | 12.5 | 14.6 | 22.9 | 6.6 | 17.6 | 3.3 |
| 615 | 2.1 | 18.3 | 18.7 | 8.2 | 6.9 | 16.6 | 22.9 | 16.3 | -10.2 | 18.0 | 15.8 | 17.4 | 12.5 | 16.4 | 10.3 | 1.5 |
| 616 | 2.6 | 24.6 | 21.5 | 15.9 | 16.9 | 9.4 | 23.0 | 8.9 | -11.8 | 12.4 | 19.9 | 8.5 | 10.2 | 13.1 | 20.5 | 2.2 |
| 617 | 4.1 | 21.0 | 6.0 | 23.8 | 14.4 | 18.4 | 24.6 | 11.1 | -5.4 | 8.3 | 10.0 | 18.5 | 15.3 | 23.2 | 12.7 | 3.2 |
| 618 | -4.5 | 10.9 | 11.7 | 6.2 | 18.1 | 10.6 | 18.3 | 18.5 | -11.2 | 23.0 | 5.8 | 20.0 | 22.6 | 24.3 | 16.2 | 3.5 |
| 619 | -1.5 | 8.7 | 24.9 | 17.5 | 21.0 | 23.7 | 15.6 | 19.7 | -9.9 | 15.0 | 9.9 | 6.9 | 21.0 | 17.8 | 10.3 | 2.6 |
| 620 | 2.6 | 23.3 | 14.3 | 10.7 | 13.0 | 12.2 | 13.7 | 11.1 | -4.6 | 20.6 | 5.6 | 21.6 | 10.4 | 7.4 | 8.7 | -0.9 |
| 621 | 0.2 | 13.3 | 17.5 | 20.0 | 17.8 | 12.6 | 10.8 | 13.2 | -8.3 | 7.2 | 17.7 | 11.5 | 5.1 | 23.7 | 13.7 | 3.8 |
| 622 | 2.6 | 10.5 | 13.6 | 18.5 | 23.4 | 18.9 | 24.6 | 9.8 | -0.4 | 12.3 | 6.5 | 13.6 | 24.1 | 16.2 | 23.6 | -4.3 |
| 623 | 1.2 | 10.2 | 20.2 | 14.9 | 21.0 | 14.6 | 22.5 | 17.7 | -9.5 | 12.4 | 13.4 | 10.7 | 8.8 | 6.8 | 13.2 | 0.5 |
| 624 | 4.4 | 21.5 | 6.8 | 8.3 | 17.7 | 10.8 | 14.3 | 13.4 | -10.5 | 15.7 | 23.5 | 6.6 | 13.4 | 7.0 | 15.5 | -0.5 |
| 625 | -4.5 | 20.1 | 22.3 | 8.3 | 9.7 | 13.7 | 22.8 | 7.4 | -5.1 | 18.8 | 10.7 | 8.0 | 14.3 | 13.9 | 22.3 | -3.9 |
| 626 | -0.4 | 19.8 | 20.8 | 6.8 | 18.0 | 6.3 | 10.6 | 15.3 | -10.5 | 13.9 | 7.1 | 16.3 | 12.4 | 14.3 | 9.6 | 0.0 |
| 627 | -2.5 | 10.9 | 11.1 | 20.4 | 21.6 | 5.8 | 12.6 | 22.9 | -7.5 | 24.8 | 16.6 | 21.4 | 15.8 | 13.9 | 15.0 | -2.9 |
| 628 | 1.0 | 21.4 | 17.8 | 23.2 | 16.0 | 7.4 | 15.6 | 7.9 | -10.3 | 18.0 | 12.9 | 24.6 | 10.2 | 21.5 | 19.6 | 1.9 |
| 629 | 3.2 | 20.1 | 20.7 | 19.8 | 21.5 | 13.6 | 9.2 | 15.8 | -4.9 | 21.2 | 9.2 | 8.7 | 12.9 | 12.5 | 19.0 | -3.5 |
| 630 | -3.6 | 8.8 | 14.0 | 19.1 | 16.3 | 11.2 | 24.8 | 18.1 | -2.7 | 20.5 | 9.0 | 17.5 | 7.8 | 24.6 | 11.9 | 4.6 |
| 631 | 3.6 | 20.6 | 9.9 | 13.0 | 24.3 | 18.0 | 7.7 | 16.9 | -5.6 | 8.2 | 11.1 | 20.6 | 15.9 | 10.4 | 11.7 | 4.1 |
| 632 | -3.6 | 7.5 | 10.4 | 11.6 | 22.8 | 17.9 | 12.7 | 15.7 | -3.9 | 6.8 | 18.9 | 14.1 | 7.9 | 19.7 | 18.3 | 1.1 |
| 633 | -0.3 | 21.5 | 16.4 | 17.8 | 13.7 | 24.7 | 22.6 | 11.5 | -12.4 | 14.2 | 23.8 | 14.0 | 20.1 | 15.4 | 23.1 | -0.9 |
| 634 | -0.7 | 5.3 | 5.4 | 17.0 | 21.4 | 23.8 | 21.2 | 20.2 | -5.2 | 12.0 | 18.8 | 18.8 | 7.5 | 9.0 | 24.4 | 1.3 |
| 635 | -2.5 | 21.1 | 9.1 | 8.4 | 16.2 | 14.4 | 19.2 | 18.4 | -12.8 | 19.8 | 12.4 | 23.2 | 18.8 | 11.6 | 8.1 | 0.7 |
| 636 | 2.3 | 20.2 | 19.5 | 8.1 | 8.6 | 11.7 | 5.1 | 21.0 | -5.1 | 7.6 | 13.7 | 18.3 | 17.6 | 22.3 | 11.2 | 0.2 |
| 637 | -3.5 | 6.8 | 14.2 | 16.1 | 17.1 | 6.6 | 14.4 | 24.7 | -11.2 | 11.0 | 17.0 | 10.6 | 13.5 | 21.9 | 13.1 | 4.4 |
| 638 | -3.6 | 20.7 | 6.2 | 22.4 | 18.2 | 11.9 | 14.2 | 20.9 | -12.9 | 6.7 | 7.1 | 12.7 | 23.7 | 11.4 | 17.3 | 1.8 |
| 639 | -4.6 | 21.8 | 16.7 | 12.8 | 11.0 | 18.8 | 8.1 | 9.3 | -5.3 | 12.9 | 18.0 | 7.9 | 23.7 | 7.2 | 13.6 | 4.2 |
| 640 | 0.4 | 10.7 | 12.0 | 6.4 | 15.7 | 24.3 | 16.5 | 7.1 | -11.7 | 5.5 | 22.0 | 12.0 | 6.7 | 21.5 | 9.1 | 4.4 |
| 641 | 0.0 | 14.8 | 12.9 | 8.3 | 17.8 | 15.7 | 5.2 | 20.8 | -4.6 | 5.8 | 17.1 | 7.9 | 9.1 | 21.8 | 20.8 | 2.7 |
| 642 | 3.1 | 5.5 | 8.5 | 23.8 | 9.4 | 6.1 | 12.5 | 8.1 | -12.0 | 12.7 | 13.6 | 19.0 | 17.9 | 17.3 | 22.2 | 3.2 |
| 643 | 0.5 | 8.8 | 15.9 | 24.8 | 6.7 | 16.1 | 17.6 | 6.4 | -0.5 | 8.8 | 15.3 | 9.5 | 19.5 | 10.9 | 6.3 | 4.3 |
| 644 | 0.5 | 15.4 | 11.5 | 18.1 | 23.5 | 11.0 | 15.4 | 20.0 | -3.3 | 14.0 | 6.4 | 7.7 | 5.1 | 13.4 | 17.3 | 2.7 |
| 645 | -0.7 | 22.8 | 6.7 | 17.8 | 14.3 | 7.3 | 22.5 | 10.2 | -0.5 | 21.6 | 22.9 | 21.9 | 11.3 | 10.3 | 24.0 | -3.5 |
| 646 | 2.9 | 6.9 | 18.1 | 22.4 | 14.8 | 13.2 | 6.3 | 10.3 | -6.3 | 9.0 | 19.3 | 20.0 | 20.5 | 18.5 | 21.7 | 0.9 |
| 647 | 1.8 | 8.7 | 16.4 | 11.8 | 18.7 | 18.5 | 10.7 | 16.1 | -6.8 | 22.7 | 22.3 | 13.0 | 19.5 | 5.2 | 23.3 | 1.7 |
| 648 | 4.2 | 15.1 | 11.9 | 5.2 | 9.5 | 7.1 | 18.1 | 13.6 | -5.0 | 9.7 | 18.5 | 14.6 | 19.0 | 11.0 | 6.0 | 0.2 |
| 649 | 4.2 | 11.7 | 11.1 | 15.0 | 24.1 | 22.3 | 12.5 | 24.0 | -1.6 | 21.0 | 16.8 | 19.3 | 11.1 | 9.4 | 17.6 | 0.2 |
| 650 | 0.6 | 15.4 | 11.4 | 20.5 | 23.3 | 17.0 | 17.5 | 11.1 | -2.4 | 12.8 | 9.5 | 23.9 | 5.2 | 12.3 | 12.3 | 0.6 |
| 651 | 3.6 | 21.3 | 17.3 | 6.9 | 10.1 | 21.7 | 11.7 | 11.7 | -5.8 | 21.0 | 24.1 | 20.9 | 6.7 | 19.8 | 15.3 | 2.0 |
| 652 | -0.1 | 13.7 | 5.4 | 12.5 | 21.4 | 7.7 | 8.7 | 7.1 | -8.4 | 11.9 | 19.0 | 24.9 | 23.0 | 12.5 | 10.1 | 0.6 |
| 653 | -2.2 | 13.0 | 23.4 | 11.8 | 22.0 | 20.3 | 9.6 | 14.8 | -5.1 | 21.9 | 9.8 | 22.1 | 12.9 | 11.5 | 11.7 | 3.3 |
| 654 | 3.0 | 24.2 | 17.1 | 9.3 | 9.2 | 19.4 | 21.1 | 16.1 | -3.2 | 6.9 | 11.9 | 7.4 | 22.9 | 12.4 | 15.2 | 2.2 |
| 655 | -2.5 | 22.9 | 19.0 | 16.7 | 7.0 | 15.0 | 25.0 | 11.2 | -5.0 | 12.7 | 18.9 | 15.0 | 20.2 | 15.0 | 6.5 | -0.5 |
| 656 | -3.1 | 19.3 | 9.6 | 14.4 | 17.2 | 7.7 | 16.5 | 6.9 | -0.6 | 17.1 | 9.1 | 23.8 | 19.9 | 17.1 | 17.0 | 2.8 |
| 657 | 1.0 | 10.3 | 19.2 | 16.3 | 19.3 | 8.8 | 18.1 | 14.8 | -5.8 | 24.5 | 5.9 | 17.4 | 15.9 | 11.9 | 7.4 | -0.5 |
| 658 | -3.1 | 13.3 | 7.6 | 24.4 | 6.8 | 8.4 | 23.2 | 7.8 | -6.3 | 18.0 | 13.0 | 14.5 | 15.1 | 5.1 | 23.9 | -2.8 |
| 659 | 4.7 | 7.6 | 13.1 | 7.9 | 21.8 | 16.6 | 13.8 | 18.2 | -5.9 | 12.2 | 6.6 | 17.7 | 20.5 | 22.6 | 22.6 | -1.0 |
| 660 | -0.8 | 5.1 | 9.7 | 24.7 | 12.7 | 15.0 | 21.9 | 8.9 | -4.8 | 11.0 | 18.1 | 10.2 | 16.6 | 19.3 | 19.6 | -1.7 |
| 661 | 0.5 | 6.8 | 18.2 | 19.2 | 8.0 | 24.9 | 6.3 | 22.1 | -6.3 | 15.5 | 6.1 | 9.5 | 16.9 | 13.0 | 10.1 | -3.1 |
| 662 | -0.2 | 18.6 | 19.8 | 18.1 | 5.4 | 21.9 | 15.0 | 9.6 | -3.2 | 8.3 | 5.7 | 9.2 | 12.6 | 8.4 | 23.1 | -4.4 |
| 663 | -4.3 | 21.8 | 11.1 | 9.5 | 13.3 | 19.3 | 23.5 | 9.4 | -6.2 | 6.4 | 10.4 | 8.7 | 7.4 | 6.2 | 13.7 | -4.7 |
| 664 | -2.9 | 8.5 | 12.4 | 21.3 | 11.6 | 19.1 | 12.6 | 16.3 | -1.3 | 8.0 | 22.6 | 16.8 | 23.7 | 8.4 | 6.9 | -2.1 |
| 665 | 0.9 | 22.1 | 21.6 | 14.1 | 18.3 | 17.7 | 19.9 | 5.1 | 0.0 | 21.7 | 23.3 | 5.5 | 10.2 | 23.9 | 11.8 | 3.7 |
| 666 | 1.1 | 23.8 | 11.4 | 9.6 | 17.3 | 7.6 | 15.9 | 10.0 | -3.7 | 13.9 | 8.6 | 7.1 | 18.6 | 6.0 | 14.3 | -4.0 |
| 667 | -4.0 | 22.7 | 12.5 | 6.2 | 24.1 | 13.1 | 12.6 | 8.7 | -9.9 | 16.6 | 24.3 | 13.9 | 20.3 | 20.3 | 19.8 | 4.5 |
| 668 | 1.2 | 5.6 | 10.0 | 14.8 | 16.9 | 7.7 | 16.6 | 23.3 | -1.5 | 21.6 | 19.2 | 22.1 | 16.2 | 24.3 | 24.5 | 1.4 |
| 669 | 2.3 | 16.8 | 13.5 | 24.3 | 16.4 | 24.0 | 19.7 | 14.4 | -2.0 | 20.6 | 24.0 | 15.9 | 24.0 | 10.9 | 11.7 | -4.9 |
| 670 | 0.3 | 21.6 | 16.6 | 7.5 | 8.1 | 7.6 | 23.1 | 6.8 | -8.2 | 14.8 | 23.1 | 24.9 | 25.0 | 23.0 | 15.8 | 4.9 |
| 671 | 2.0 | 15.0 | 23.8 | 24.2 | 5.2 | 22.2 | 10.4 | 7.8 | -5.2 | 13.4 | 23.8 | 22.3 | 18.4 | 22.0 | 19.2 | 0.4 |
| 672 | -4.1 | 5.3 | 17.9 | 21.8 | 17.6 | 21.3 | 6.2 | 10.7 | -5.3 | 7.3 | 6.0 | 13.1 | 23.5 | 17.9 | 23.6 | -0.8 |
| 673 | 3.8 | 20.8 | 15.6 | 24.6 | 18.4 | 16.7 | 9.9 | 16.5 | -7.0 | 11.0 | 11.7 | 21.7 | 13.6 | 9.7 | 24.0 | 4.7 |
| 674 | -4.4 | 9.0 | 9.0 | 9.9 | 23.8 | 23.1 | 21.7 | 8.8 | -5.3 | 8.9 | 11.3 | 11.2 | 19.1 | 16.5 | 21.4 | 1.5 |
| 675 | 0.2 | 5.2 | 18.6 | 6.5 | 9.3 | 17.0 | 13.9 | 16.7 | -0.2 | 20.6 | 15.8 | 18.2 | 15.1 | 21.5 | 13.0 | 3.5 |

valley loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 676 | -4.5 | 18.2 | 23.1 | 18.8 | 20.9 | 19.5 | 12.6 | 12.1 | -3.9 | 10.3 | 6.2 | 19.7 | 15.9 | 7.7 | 13.6 | 3.7 |
| 677 | 2.9 | 7.7 | 18.1 | 24.3 | 8.9 | 16.9 | 11.2 | 19.8 | -9.0 | 9.2 | 24.8 | 8.9 | 5.2 | 7.5 | 14.2 | 4.2 |
| 678 | -2.9 | 15.5 | 14.8 | 14.8 | 13.6 | 11.3 | 21.6 | 12.8 | -6.8 | 13.2 | 14.1 | 10.9 | 11.9 | 19.8 | 12.8 | -1.5 |
| 679 | -2.3 | 9.4 | 14.3 | 19.3 | 15.5 | 11.7 | 21.5 | 12.9 | -3.0 | 17.3 | 23.3 | 12.2 | 19.2 | 11.9 | 12.2 | 2.0 |
| 680 | 2.2 | 8.4 | 6.6 | 17.6 | 15.5 | 23.8 | 21.2 | 17.5 | -7.0 | 5.3 | 6.6 | 8.9 | 5.8 | 20.0 | 15.4 | -4.9 |
| 681 | -4.0 | 20.0 | 14.9 | 9.8 | 24.5 | 23.0 | 19.5 | 14.6 | -1.4 | 5.0 | 18.6 | 15.5 | 6.2 | 22.3 | 13.1 | 4.4 |
| 682 | 0.2 | 10.4 | 12.6 | 15.7 | 22.2 | 24.8 | 24.9 | 21.7 | -3.1 | 14.5 | 23.3 | 23.2 | 12.1 | 20.1 | 6.6 | -3.7 |
| 683 | 4.7 | 11.7 | 23.9 | 9.9 | 6.6 | 5.4 | 8.7 | 22.2 | -1.7 | 13.2 | 23.5 | 6.2 | 23.8 | 10.9 | 17.0 | 4.9 |
| 684 | -0.1 | 15.0 | 17.5 | 18.9 | 20.8 | 11.8 | 13.8 | 6.2 | -6.2 | 7.8 | 13.4 | 18.0 | 23.0 | 15.7 | 20.2 | 0.5 |
| 685 | -2.5 | 21.7 | 22.9 | 12.9 | 9.3 | 24.7 | 7.4 | 7.7 | -5.4 | 6.8 | 6.8 | 11.2 | 11.2 | 11.6 | 16.9 | -1.2 |
| 686 | 0.2 | 23.9 | 25.0 | 20.7 | 23.6 | 20.7 | 21.1 | 16.0 | -2.4 | 15.8 | 9.1 | 13.5 | 8.6 | 20.5 | 13.0 | -2.6 |
| 687 | 0.5 | 10.4 | 23.5 | 5.1 | 5.2 | 7.9 | 19.3 | 14.0 | -9.0 | 11.8 | 11.9 | 17.7 | 11.3 | 20.3 | 17.6 | -3.6 |
| 688 | -0.1 | 20.4 | 14.1 | 18.6 | 20.4 | 24.1 | 21.2 | 9.5 | -8.4 | 5.9 | 24.1 | 10.9 | 9.6 | 12.7 | 21.6 | -0.2 |
| 689 | -3.1 | 8.4 | 22.5 | 9.9 | 14.5 | 8.6 | 19.3 | 11.0 | -4.5 | 23.7 | 16.4 | 12.9 | 24.4 | 20.7 | 15.5 | -2.8 |
| 690 | -4.9 | 17.2 | 5.3 | 17.5 | 15.7 | 22.0 | 5.8 | 23.4 | -6.8 | 13.6 | 24.4 | 17.7 | 19.8 | 23.5 | 11.8 | 4.7 |
| 691 | -1.2 | 9.5 | 16.1 | 15.9 | 10.6 | 15.0 | 7.8 | 9.5 | -1.5 | 14.6 | 12.7 | 16.0 | 11.1 | 18.6 | 10.4 | -1.6 |
| 692 | 2.4 | 21.2 | 19.9 | 14.7 | 20.3 | 6.6 | 10.5 | 8.5 | -4.2 | 21.2 | 19.5 | 14.3 | 6.6 | 16.9 | 22.3 | -2.4 |
| 693 | -1.9 | 18.7 | 22.6 | 7.8 | 11.3 | 22.0 | 18.9 | 19.9 | -1.3 | 7.6 | 15.0 | 5.7 | 23.4 | 16.3 | 11.3 | -4.2 |
| 694 | 3.2 | 6.5 | 11.4 | 17.5 | 9.2 | 7.3 | 16.4 | 22.4 | -3.5 | 13.8 | 8.0 | 12.8 | 6.2 | 13.8 | 18.3 | 0.7 |
| 695 | 4.2 | 9.7 | 9.9 | 12.5 | 9.2 | 10.8 | 5.2 | 12.5 | -5.7 | 18.8 | 13.6 | 23.1 | 19.5 | 13.0 | 13.6 | 0.6 |
| 696 | -0.3 | 7.0 | 20.5 | 11.4 | 23.2 | 11.9 | 11.9 | 8.7 | -4.4 | 12.5 | 20.2 | 5.2 | 23.5 | 7.9 | 14.5 | -4.2 |
| 697 | 4.2 | 12.5 | 5.4 | 7.5 | 18.1 | 14.6 | 10.9 | 17.6 | -5.6 | 22.9 | 5.4 | 16.2 | 24.3 | 11.8 | 24.6 | 1.2 |
| 698 | 1.7 | 13.2 | 9.1 | 21.9 | 11.6 | 7.8 | 14.0 | 13.8 | -1.4 | 17.5 | 23.8 | 6.9 | 19.4 | 20.9 | 7.1 | -4.5 |
| 699 | -2.4 | 17.1 | 23.4 | 20.6 | 22.9 | 5.4 | 18.6 | 12.6 | -4.7 | 11.4 | 15.6 | 6.7 | 5.3 | 18.3 | 16.8 | 5.0 |
| 700 | 2.6 | 24.4 | 11.1 | 13.9 | 6.3 | 12.7 | 9.1 | 16.0 | -0.9 | 11.6 | 17.0 | 24.5 | 9.6 | 14.7 | 7.9 | 1.6 |
| 701 | -4.5 | 22.0 | 15.9 | 19.2 | 8.8 | 13.0 | 9.9 | 22.6 | -4.0 | 12.7 | 19.9 | 5.5 | 9.6 | 20.5 | 18.2 | 3.4 |
| 702 | -3.7 | 9.1 | 18.5 | 12.9 | 21.5 | 6.6 | 9.1 | 12.3 | -5.0 | 16.0 | 13.3 | 9.1 | 14.6 | 13.3 | 7.7 | -2.1 |
| 703 | 4.0 | 22.1 | 21.9 | 19.3 | 11.8 | 21.7 | 16.8 | 15.9 | -2.4 | 6.9 | 19.6 | 18.3 | 23.2 | 24.8 | 17.6 | -3.3 |
| 704 | 3.5 | 21.8 | 7.9 | 24.9 | 18.1 | 12.4 | 22.0 | 5.7 | -7.8 | 19.9 | 21.5 | 8.1 | 21.4 | 6.5 | 14.3 | -3.6 |
| 705 | 2.1 | 8.7 | 9.2 | 10.8 | 20.3 | 15.1 | 24.4 | 7.4 | -0.4 | 22.7 | 7.7 | 11.3 | 5.9 | 6.0 | 21.0 | 4.4 |
| 706 | -2.6 | 6.7 | 17.1 | 13.3 | 6.9 | 23.0 | 8.7 | 25.0 | -4.4 | 24.4 | 23.3 | 14.1 | 21.1 | 14.1 | 24.6 | -4.2 |
| 707 | 2.2 | 24.7 | 9.3 | 13.9 | 21.6 | 21.4 | 8.5 | 16.2 | 0.0 | 9.4 | 8.8 | 11.1 | 7.5 | 6.6 | 15.2 | 4.8 |
| 708 | -3.9 | 7.3 | 10.7 | 10.4 | 13.4 | 12.4 | 18.0 | 7.9 | -5.1 | 9.1 | 17.7 | 10.7 | 11.1 | 17.4 | 8.0 | -2.0 |
| 709 | 3.0 | 20.2 | 23.3 | 23.9 | 7.9 | 22.0 | 21.2 | 9.1 | -7.1 | 24.1 | 18.0 | 19.3 | 12.6 | 23.8 | 15.9 | 2.0 |
| 710 | -2.3 | 5.1 | 16.1 | 16.1 | 23.4 | 12.8 | 20.2 | 7.8 | -4.7 | 19.3 | 11.9 | 11.9 | 24.6 | 5.7 | 13.0 | -4.7 |
| 711 | -0.4 | 20.9 | 8.4 | 9.1 | 17.9 | 6.4 | 15.6 | 23.6 | -7.6 | 14.7 | 11.0 | 21.8 | 15.0 | 7.8 | 18.9 | 3.9 |
| 712 | 3.4 | 15.6 | 20.0 | 8.0 | 13.8 | 7.6 | 6.7 | 14.4 | -6.5 | 13.0 | 9.5 | 8.0 | 11.5 | 20.7 | 13.1 | 0.7 |
| 713 | 2.9 | 14.6 | 24.9 | 23.6 | 12.2 | 12.3 | 13.1 | 10.9 | -8.2 | 8.9 | 15.3 | 8.9 | 24.7 | 19.7 | 18.9 | 1.3 |
| 714 | -1.1 | 23.9 | 13.4 | 16.1 | 5.0 | 7.2 | 18.4 | 23.3 | -7.2 | 23.6 | 9.0 | 10.7 | 20.5 | 21.6 | 19.9 | 0.5 |
| 715 | -1.2 | 6.3 | 20.5 | 12.9 | 10.6 | 19.9 | 9.4 | 7.6 | -3.8 | 20.0 | 7.7 | 20.9 | 7.9 | 14.8 | 19.2 | 3.5 |
| 716 | 0.2 | 12.3 | 8.8 | 13.4 | 12.1 | 8.1 | 15.9 | 9.2 | -4.3 | 19.6 | 10.2 | 18.0 | 17.7 | 22.1 | 12.7 | -3.5 |
| 717 | 3.6 | 7.2 | 8.0 | 16.3 | 17.7 | 16.2 | 14.3 | 10.5 | -9.4 | 14.7 | 15.4 | 25.0 | 11.4 | 16.2 | 23.9 | -4.6 |
| 718 | -2.1 | 11.6 | 22.1 | 10.3 | 23.4 | 21.0 | 19.6 | 22.2 | -6.9 | 11.5 | 16.9 | 24.3 | 15.4 | 7.4 | 22.7 | -1.8 |
| 719 | 2.8 | 5.4 | 11.0 | 16.0 | 18.0 | 18.0 | 20.0 | 17.2 | -6.9 | 19.6 | 21.8 | 22.9 | 8.3 | 23.5 | 20.8 | -0.6 |
| 720 | 2.6 | 16.5 | 12.5 | 10.3 | 16.8 | 21.6 | 18.4 | 16.5 | -5.3 | 22.1 | 23.7 | 14.3 | 5.7 | 5.1 | 19.0 | -4.5 |
| 721 | -2.6 | 22.1 | 5.0 | 15.8 | 16.6 | 6.0 | 24.4 | 23.3 | -7.9 | 14.8 | 16.7 | 20.5 | 7.9 | 21.0 | 16.4 | -4.7 |
| 722 | 4.6 | 19.5 | 12.4 | 18.1 | 9.6 | 14.7 | 16.6 | 18.5 | -6.1 | 13.9 | 24.0 | 7.1 | 6.1 | 24.0 | 21.3 | -1.6 |
| 723 | 3.4 | 20.8 | 15.4 | 14.3 | 13.1 | 15.8 | 15.8 | 16.5 | -4.3 | 8.1 | 12.5 | 23.4 | 14.2 | 22.5 | 14.0 | 4.3 |
| 724 | 3.3 | 10.8 | 18.5 | 16.2 | 6.2 | 10.8 | 18.4 | 20.9 | -1.9 | 8.2 | 13.3 | 9.4 | 13.2 | 16.3 | 22.2 | 1.9 |
| 725 | 1.1 | 24.9 | 22.6 | 15.2 | 13.3 | 6.7 | 24.6 | 5.9 | -8.3 | 24.1 | 21.0 | 7.3 | 20.3 | 12.7 | 19.1 | -1.6 |
| 726 | -2.9 | 15.6 | 7.8 | 12.9 | 21.5 | 6.9 | 5.7 | 16.1 | -8.2 | 17.4 | 22.7 | 19.2 | 9.3 | 17.1 | 14.0 | -4.3 |
| 727 | -0.8 | 23.9 | 20.4 | 14.8 | 9.6 | 5.3 | 19.5 | 11.5 | -3.5 | 16.0 | 20.3 | 6.7 | 5.2 | 6.5 | 7.5 | -2.6 |
| 728 | -2.9 | 13.8 | 8.1 | 24.3 | 20.5 | 17.7 | 15.3 | 23.8 | -2.4 | 5.1 | 6.2 | 10.1 | 24.4 | 5.7 | 22.6 | 4.9 |
| 729 | -0.8 | 14.3 | 10.7 | 17.7 | 18.4 | 24.0 | 24.6 | 14.4 | -7.2 | 10.1 | 22.7 | 20.3 | 6.3 | 13.5 | 7.0 | -3.7 |
| 730 | 4.0 | 9.6 | 18.9 | 5.3 | 7.4 | 18.6 | 12.4 | 24.4 | -8.9 | 17.7 | 21.4 | 8.2 | 14.2 | 7.8 | 7.3 | -0.6 |
| 731 | -0.5 | 19.6 | 20.0 | 20.4 | 21.5 | 20.4 | 24.8 | 20.9 | -7.0 | 20.5 | 8.7 | 18.0 | 7.7 | 10.3 | 18.3 | 1.2 |
| 732 | 3.0 | 24.9 | 6.3 | 20.5 | 11.7 | 6.8 | 8.3 | 18.5 | -2.1 | 5.4 | 22.5 | 10.7 | 18.1 | 22.0 | 20.6 | 1.9 |
| 733 | -3.1 | 12.4 | 6.7 | 22.7 | 17.4 | 7.8 | 7.8 | 22.1 | -0.6 | 11.9 | 5.1 | 9.6 | 22.9 | 5.8 | 9.4 | 1.8 |
| 734 | -3.5 | 9.3 | 17.4 | 10.6 | 18.7 | 22.6 | 12.4 | 20.0 | -9.3 | 20.4 | 12.8 | 17.7 | 18.6 | 13.4 | 12.4 | 1.6 |
| 735 | -1.8 | 5.4 | 22.8 | 24.3 | 15.2 | 18.6 | 8.6 | 16.2 | -7.5 | 20.0 | 20.0 | 15.2 | 12.4 | 18.5 | 12.8 | -0.7 |
| 736 | -3.4 | 21.7 | 19.7 | 24.6 | 18.0 | 21.7 | 13.2 | 8.2 | -3.3 | 14.5 | 12.0 | 17.3 | 20.9 | 7.5 | 21.2 | 3.5 |
| 737 | -0.1 | 21.7 | 7.4 | 5.7 | 16.6 | 13.9 | 19.8 | 25.0 | -1.2 | 6.2 | 13.6 | 10.7 | 20.2 | 6.5 | 20.0 | 3.1 |
| 738 | -3.8 | 11.6 | 24.7 | 5.8 | 10.7 | 23.4 | 22.4 | 12.5 | -6.5 | 19.6 | 5.2 | 23.9 | 17.3 | 16.3 | 10.8 | 4.0 |
| 739 | -2.7 | 24.9 | 11.3 | 6.9 | 10.1 | 16.1 | 21.2 | 5.9 | -3.1 | 19.8 | 20.2 | 14.5 | 9.7 | 21.3 | 20.2 | 0.5 |
| 740 | -0.4 | 9.6 | 11.4 | 20.9 | 8.7 | 16.1 | 24.3 | 14.7 | -9.7 | 13.4 | 25.0 | 23.8 | 11.3 | 7.3 | 17.3 | -0.1 |
| 741 | -0.1 | 21.1 | 22.6 | 9.4 | 17.4 | 12.7 | 22.6 | 12.8 | -8.3 | 17.9 | 16.2 | 20.9 | 17.1 | 9.8 | 17.4 | 3.2 |
| 742 | -3.1 | 17.8 | 17.2 | 10.9 | 16.8 | 13.6 | 8.2 | 8.1 | -2.6 | 8.7 | 8.3 | 21.9 | 8.4 | 11.0 | 22.5 | 4.7 |
| 743 | 1.6 | 20.5 | 15.2 | 12.3 | 10.2 | 16.5 | 16.8 | 20.1 | -4.9 | 16.5 | 16.2 | 12.5 | 16.9 | 16.2 | 20.7 | -4.6 |
| 744 | 3.4 | 5.4 | 11.0 | 19.6 | 9.5 | 24.7 | 17.7 | 19.0 | -1.0 | 15.3 | 18.1 | 11.3 | 20.8 | 20.9 | 14.1 | 2.7 |
| 745 | 2.2 | 15.1 | 23.2 | 22.0 | 6.8 | 15.0 | 5.0 | 16.7 | -5.1 | 24.5 | 13.7 | 20.2 | 7.3 | 13.3 | 23.6 | -4.7 |
| 746 | -0.8 | 10.3 | 15.3 | 8.7 | 14.7 | 20.3 | 13.1 | 11.0 | -7.8 | 20.5 | 17.4 | 13.2 | 10.0 | 23.3 | 10.8 | -3.6 |
| 747 | -1.6 | 17.9 | 24.0 | 16.9 | 6.9 | 15.6 | 24.2 | 10.2 | -8.0 | 24.4 | 11.2 | 24.2 | 11.1 | 12.5 | 23.0 | 0.8 |
| 748 | 0.4 | 12.6 | 12.4 | 9.2 | 20.4 | 5.9 | 23.5 | 19.5 | -3.9 | 23.9 | 17.0 | 22.2 | 21.9 | 8.0 | 20.2 | 2.3 |
| 749 | 4.2 | 8.8 | 16.8 | 6.2 | 10.5 | 9.9 | 16.8 | 6.7 | -0.7 | 22.4 | 21.3 | 22.6 | 22.4 | 12.8 | 22.4 | -0.3 |
| 750 | -0.3 | 8.3 | 14.9 | 17.0 | 15.1 | 6.4 | 10.6 | 15.4 | -2.3 | 18.5 | 14.1 | 11.5 | 18.8 | 6.1 | 12.5 | -4.4 |

valley loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 751 | 0.1 | 22.0 | 21.5 | 20.9 | 9.0 | 16.3 | 14.2 | 15.1 | -5.9 | 22.1 | 18.1 | 5.2 | 15.8 | 5.9 | 17.6 | 3.1 |
| 752 | 1.8 | 11.0 | 8.0 | 9.1 | 6.1 | 6.0 | 18.0 | 8.8 | -5.6 | 15.0 | 8.9 | 9.8 | 11.8 | 23.3 | 11.0 | 1.4 |
| 753 | 4.2 | 7.7 | 18.0 | 5.7 | 18.9 | 23.2 | 18.4 | 9.4 | -8.2 | 16.2 | 6.0 | 17.9 | 9.7 | 18.5 | 5.5 | -3.2 |
| 754 | 1.6 | 7.4 | 5.3 | 23.5 | 14.8 | 6.5 | 10.3 | 19.6 | -2.9 | 19.4 | 19.4 | 13.7 | 5.8 | 20.0 | 17.3 | -2.3 |
| 755 | -2.6 | 20.2 | 11.9 | 12.1 | 7.7 | 16.6 | 12.6 | 8.0 | -0.4 | 24.6 | 9.7 | 21.0 | 9.0 | 22.8 | 8.8 | -0.8 |
| 756 | 4.2 | 8.[illegible] | [illegible].8 | 13.3 | 10.0 | 9.2 | 16.3 | 15.8 | -0.5 | 24.4 | 21.0 | 14.9 | 13.7 | 17.9 | 17.5 | 0.1 |
| 757 | 3.0 | 8.6 | 7.4 | 11.6 | 15.8 | 12.0 | 13.0 | 18.9 | -5.1 | 11.5 | 11.5 | 7.2 | 20.1 | 13.2 | 19.9 | -4.9 |
| 758 | -2.5 | 17.0 | 5.3 | 8.7 | 12.4 | 9.7 | 17.7 | 21.9 | -3.0 | 17.5 | 12.7 | 8.4 | 12.6 | 23.9 | 18.8 | -2.9 |
| 759 | 4.5 | 19.5 | 21.4 | 16.5 | 16.3 | 21.9 | 18.6 | 8.8 | -2.5 | 18.4 | 7.5 | 13.8 | 19.0 | 15.2 | 17.6 | -0.8 |
| 760 | -4.2 | 13.0 | 22.4 | 10.7 | 18.5 | 14.5 | 11.2 | 22.0 | -1.8 | 11.7 | 10.3 | 12.5 | 14.2 | 18.3 | 19.0 | -0.4 |
| 761 | 1.1 | 18.5 | 19.0 | 5.2 | 24.1 | 18.7 | 23.9 | 22.7 | -5.3 | 14.8 | 15.8 | 21.6 | 14.6 | 21.7 | 18.6 | -4.8 |
| 762 | -1.3 | 24.7 | 21.9 | 24.2 | 13.4 | 20.0 | 18.5 | 14.5 | -7.9 | 14.0 | 12.9 | 20.1 | 15.9 | 15.4 | 15.9 | -1.2 |
| 763 | 4.9 | 11.1 | 14.5 | 13.8 | 20.4 | 20.3 | 17.1 | 16.8 | -6.3 | 20.3 | 12.0 | 17.3 | 18.0 | 17.6 | 5.2 | -3.4 |
| 764 | -3.1 | 17.3 | 22.7 | 19.1 | 17.7 | 7.3 | 21.3 | 20.0 | -7.3 | 13.6 | 9.0 | 20.0 | 12.3 | 11.0 | 8.9 | -3.5 |
| 765 | 0.8 | 17.0 | 20.3 | 19.7 | 8.7 | 16.0 | 9.1 | 13.9 | -1.5 | 23.4 | 15.0 | 24.1 | 23.8 | 9.4 | 6.6 | -1.8 |
| 766 | -0.3 | 18.9 | 16.5 | 17.9 | 13.6 | 11.4 | 20.3 | 13.4 | -9.7 | 24.6 | 14.9 | 9.2 | 9.6 | 9.1 | 13.6 | -4.4 |
| 767 | 2.2 | 6.6 | 17.4 | 16.4 | 21.5 | 14.7 | 16.6 | 19.3 | -3.0 | 20.7 | 12.0 | 7.2 | 17.8 | 16.3 | 24.4 | -2.4 |
| 768 | -3.0 | 9.8 | 12.4 | 15.6 | 17.1 | 21.9 | 7.2 | 21.6 | -7.4 | 10.5 | 8.8 | 24.0 | 17.6 | 16.6 | 9.1 | -1.5 |
| 769 | 0.7 | 15.7 | 5.2 | 6.2 | 5.3 | 17.8 | 6.7 | 22.7 | -6.1 | 7.0 | 14.6 | 23.9 | 10.0 | 20.4 | 14.5 | -3.0 |
| 770 | -1.1 | 6.8 | 12.3 | 13.1 | 10.2 | 24.6 | 5.5 | 11.7 | -9.7 | 5.1 | 14.8 | 23.2 | 23.1 | 20.7 | 7.7 | -2.3 |
| 771 | -2.0 | 14.7 | 20.8 | 12.3 | 21.7 | 8.9 | 17.5 | 11.2 | -1.2 | 6.6 | 5.2 | 21.7 | 14.2 | 23.5 | 9.2 | -4.2 |
| 772 | -0.3 | 6.2 | 11.6 | 15.3 | 8.9 | 8.4 | 10.3 | 24.2 | -5.5 | 14.5 | 21.0 | 7.9 | 13.3 | 22.6 | 13.3 | -4.1 |
| 773 | 4.7 | 12.4 | 10.5 | 21.5 | 10.5 | 12.9 | 6.2 | 19.3 | -1.2 | 13.9 | 7.0 | 24.2 | 14.3 | 10.6 | 20.3 | -4.8 |
| 774 | -1.1 | 11.8 | 13.0 | 19.5 | 15.6 | 15.0 | 21.3 | 19.3 | -4.1 | 18.5 | 15.6 | 21.2 | 13.9 | 18.4 | 14.6 | -4.4 |
| 775 | 4.5 | 22.8 | 15.3 | 24.6 | 24.7 | 22.5 | 6.5 | 9.3 | -0.1 | 14.8 | 11.5 | 6.8 | 18.2 | 24.8 | 20.0 | -4.4 |
| 776 | -4.4 | 10.0 | 9.3 | 8.0 | 7.3 | 21.8 | 18.0 | 19.1 | -1.6 | 7.4 | 10.9 | 12.1 | 20.7 | 24.3 | 5.9 | -4.5 |
| 777 | 4.3 | 20.8 | 14.3 | 18.4 | 24.5 | 5.5 | 9.2 | 13.6 | -7.4 | 9.7 | 17.2 | 24.5 | 22.5 | 6.5 | 8.8 | -8.4 |
| 778 | -2.9 | 7.8 | 11.5 | 14.7 | 7.4 | 16.5 | 22.6 | 7.4 | -0.3 | 16.0 | 22.6 | 22.2 | 6.8 | 11.1 | 8.8 | -1.7 |
| 779 | 3.2 | 23.5 | 22.7 | 12.6 | 6.2 | 5.6 | 17.0 | 9.0 | -0.3 | 11.0 | 6.5 | 11.3 | 17.6 | 11.4 | 23.7 | -0.6 |
| 780 | -3.2 | 15.4 | 12.1 | 19.3 | 23.5 | 21.0 | 21.7 | 11.1 | -7.0 | 20.1 | 21.0 | 7.9 | 10.3 | 15.5 | 13.1 | -2.2 |
| 781 | 3.8 | 20.2 | 23.5 | 24.8 | 17.6 | 24.4 | 6.6 | 5.6 | -5.6 | 22.2 | 7.3 | 20.0 | 7.9 | 21.3 | 11.4 | -0.7 |
| 782 | -4.4 | 21.3 | 17.5 | 12.5 | 18.8 | 9.0 | 24.8 | 23.4 | -4.7 | 24.5 | 13.6 | 9.5 | 5.1 | 5.7 | 11.9 | -4.5 |
| 783 | 2.9 | 24.9 | 15.8 | 23.4 | 15.0 | 13.2 | 23.9 | 23.3 | -9.4 | 10.0 | 19.6 | 17.0 | 12.1 | 21.5 | 12.8 | -0.4 |
| 784 | 0.6 | 16.8 | 22.5 | 11.0 | 24.1 | 19.0 | 12.9 | 5.6 | -8.8 | 20.8 | 21.0 | 13.1 | 5.2 | 8.5 | 8.4 | -4.5 |
| 785 | -2.6 | 6.7 | 23.6 | 9.1 | 21.4 | 17.1 | 7.0 | 11.6 | -6.8 | 23.6 | 12.5 | 16.4 | 8.0 | 12.8 | 8.8 | -4.9 |
| 786 | -3.5 | 16.2 | 24.2 | 14.4 | 10.9 | 7.8 | 10.0 | 21.9 | -3.9 | 23.7 | 15.0 | 13.5 | 20.6 | 23.8 | 18.2 | -4.9 |
| 787 | 2.8 | 23.0 | 5.3 | 10.9 | 11.2 | 12.1 | 11.3 | 16.7 | -2.7 | 5.6 | 17.0 | 21.6 | 20.4 | 19.3 | 13.6 | -2.6 |
| 788 | 1.0 | 24.4 | 5.9 | 5.9 | 20.6 | 6.8 | 17.2 | 22.1 | -9.1 | 24.7 | 17.9 | 12.8 | 23.[illegible] | 19.0 | 6.2 | -4.0 |
| 789 | -3.5 | 17.7 | 21.4 | 19.9 | 19.5 | 16.2 | 9.3 | 15.8 | -9.9 | 22.1 | 14.6 | 19.3 | 20.[illegible] | 16.3 | 23.6 | -0.2 |
| 790 | -4.9 | 10.7 | 16.7 | 5.5 | 10.8 | 6.4 | 20.2 | 19.1 | -3.1 | 21.0 | 19.8 | 5.4 | 11.1 | 22.4 | 8.5 | -3.9 |
| 791 | 4.4 | 22.7 | 5.4 | 8.1 | 5.9 | 11.1 | 23.2 | 18.0 | -0.9 | 24.3 | 11.5 | 12.5 | 12.2 | 16.3 | 8.1 | -4.0 |
| 792 | 2.2 | 19.9 | 18.5 | 25.0 | 9.4 | 24.2 | 18.8 | 14.0 | -2.0 | 14.3 | 18.5 | 5.2 | 8.4 | 24.0 | 12.8 | -1.1 |
| 793 | -4.5 | 9.3 | 17.3 | 11.0 | 15.4 | 24.0 | 9.0 | 17.4 | -3.9 | 18.8 | 7.3 | 16.4 | 12.9 | 7.5 | 5.1 | -2.5 |
| 794 | -3.0 | 8.7 | 23.1 | 19.7 | 16.3 | 11.4 | 14.0 | 11.8 | -7.8 | 7.2 | 13.2 | 9.2 | 16.0 | 15.1 | 8.4 | -1.0 |
| 795 | 2.1 | 22.7 | 11.3 | 10.3 | 20.5 | 15.8 | 23.1 | 13.1 | -8.7 | 16.3 | 18.9 | 21.1 | 5.0 | 13.6 | 12.8 | -4.9 |
| 796 | -4.3 | 8.8 | 7.8 | 22.5 | 14.1 | 10.7 | 24.6 | 13.6 | -1.7 | 15.2 | 6.0 | 23.7 | 21.6 | 18.0 | 17.3 | -1.1 |
| 797 | 3.2 | 9.5 | 7.1 | 5.9 | 16.1 | 5.2 | 20.7 | 10.6 | -3.6 | 17.5 | 9.3 | 20.0 | 15.6 | 14.0 | 24.0 | -0.7 |
| 798 | 2.2 | 7.0 | 9.1 | 6.3 | 8.9 | 15.8 | 18.9 | 23.2 | -8.3 | 12.9 | 10.2 | 13.2 | 13.7 | 10.1 | 16.2 | -1.5 |
| 799 | -3.8 | 22.5 | 7.9 | 16.1 | 21.1 | 7.3 | 13.3 | 18.3 | -8.8 | 22.9 | 8.1 | 19.4 | 9.2 | 19.9 | 13.7 | -3.1 |
| 800 | 3.5 | 20.6 | 7.8 | 14.1 | 6.3 | 17.8 | 21.9 | 10.5 | -2.6 | 18.8 | 20.9 | 15.2 | 13.7 | 19.9 | 16.8 | -4.0 |
| 801 | -4.7 | 19.5 | 11.7 | 13.9 | 19.4 | 12.2 | 5.5 | 11.8 | -9.7 | 11.7 | 8.8 | 15.8 | 18.2 | 11.7 | 11.0 | -3.1 |
| 802 | -0.8 | 13.6 | 9.1 | 21.7 | 8.1 | 19.1 | 22.3 | 11.8 | -7.0 | 7.7 | 23.0 | 18.4 | 15.0 | 6.4 | 13.7 | -1.8 |
| 803 | 1.9 | 11.0 | 17.8 | 14.9 | 20.8 | 5.4 | 23.4 | 16.3 | -1.3 | 20.4 | 23.7 | 23.9 | 10.7 | 19.3 | 16.3 | -2.5 |
| 804 | 3.8 | 23.4 | 9.4 | 21.9 | 23.7 | 14.9 | 21.4 | 16.6 | -2.6 | 15.3 | 14.1 | 17.2 | 12.9 | 7.2 | 20.3 | -0.5 |
| 805 | 0.0 | 9.6 | 8.0 | 12.1 | 10.6 | 13.9 | 24.8 | 18.6 | -2.8 | 22.4 | 12.5 | 5.2 | 23.1 | 12.7 | 15.6 | -3.8 |
| 806 | -2.6 | 16.8 | 11.8 | 8.9 | 9.0 | 14.8 | 16.2 | 21.7 | -3.1 | 24.8 | 15.3 | 8.0 | 10.0 | 18.8 | 15.4 | -3.9 |
| 807 | -4.4 | 9.0 | 11.2 | 9.9 | 15.4 | 11.0 | 8.8 | 23.3 | -2.9 | 7.5 | 11.8 | 20.0 | 6.1 | 15.2 | 6.5 | -2.0 |
| 808 | 2.2 | 10.1 | 6.5 | 24.0 | 18.1 | 11.1 | 24.8 | 17.4 | -4.1 | 11.1 | 8.3 | 9.6 | 14.8 | 11.5 | 23.2 | -0.9 |
| 809 | 1.6 | 21.8 | 17.6 | 9.0 | 22.7 | 8.8 | 8.5 | 18.8 | -5.1 | 6.1 | 20.5 | 8.4 | 17.4 | 17.7 | 19.5 | -1.7 |
| 810 | 3.3 | 20.6 | 11.1 | 25.0 | 8.9 | 17.3 | 7.0 | 24.5 | -2.9 | 6.1 | 19.0 | 17.0 | 24.1 | 9.3 | 5.2 | -3.1 |
| 811 | -2.7 | 7.7 | 11.8 | 12.0 | 6.2 | 16.0 | 13.5 | 10.9 | -0.6 | 8.9 | 12.7 | 5.5 | 21.3 | 17.1 | 12.1 | -2.9 |
| 812 | 3.5 | 16.1 | 12.4 | 13.2 | 10.3 | 17.2 | 14.6 | 11.7 | -3.9 | 15.2 | 13.5 | 22.8 | 14.3 | 22.1 | 21.6 | -3.1 |
| 813 | -1.1 | 14.9 | 22.6 | 21.1 | 18.7 | 9.5 | 5.3 | 23.6 | -7.1 | 21.2 | 7.3 | 8.0 | 9.0 | 15.2 | 8.4 | -0.9 |
| 814 | -3.5 | 12.0 | 7.5 | 12.7 | 19.0 | 24.7 | 24.0 | 16.9 | -7.2 | 6.6 | 17.4 | 24.8 | 13.7 | 13.5 | 15.9 | -2.2 |
| 815 | 1.8 | 12.8 | 23.5 | 16.8 | 18.2 | 15.6 | 24.0 | 15.7 | -1.7 | 9.7 | 8.1 | 18.2 | 12.2 | 16.6 | 16.8 | -0.6 |
| 816 | 4.7 | 16.0 | 7.7 | 10.4 | 19.9 | 25.0 | 6.8 | 8.9 | -9.1 | 19.4 | 19.4 | 20.5 | 8.4 | 9.3 | 18.9 | -3.2 |
| 817 | -3.2 | 24.6 | 9.5 | 12.1 | 11.0 | 6.4 | 6.9 | 16.4 | -1.7 | 6.0 | 5.5 | 24.4 | 17.4 | 24.3 | 15.4 | -4.8 |
| 818 | -3.6 | 15.8 | 16.6 | 21.3 | 13.3 | 19.3 | 5.2 | 14.5 | -4.1 | 7.0 | 11.8 | 21.5 | 14.1 | 9.8 | 7.8 | -4.0 |
| 819 | -3.7 | 7.8 | 15.9 | 22.1 | 23.0 | 17.1 | 8.9 | 12.0 | -9.8 | 18.6 | 15.7 | 7.1 | 12.3 | 11.4 | 12.5 | -1.9 |
| 820 | -4.7 | 6.2 | 10.9 | 17.2 | 7.8 | 13.1 | 6.2 | 12.8 | -4.7 | 7.5 | 18.4 | 7.0 | 23.0 | 16.3 | 17.1 | -2.1 |
| 821 | -1.7 | 12.6 | 12.5 | 19.7 | 6.4 | 5.8 | 21.7 | 14.5 | -4.1 | 15.7 | 13.3 | 21.4 | 15.1 | 14.3 | 13.7 | -4.6 |
| 822 | -4.7 | 15.6 | 8.1 | 24.1 | 17.7 | 15.7 | 16.9 | 20.3 | -5.2 | 11.1 | 22.9 | 10.4 | 6.0 | 6.4 | 23.7 | -3.5 |
| 823 | -4.8 | 23.5 | 19.2 | 19.4 | 14.0 | 6.6 | 23.4 | 18.4 | -0.1 | 17.1 | 10.5 | 6.7 | 8.2 | 5.6 | 7.8 | -4.9 |
| 824 | -2.5 | 18.5 | 18.5 | 15.5 | 18.5 | 9.5 | 13.1 | 23.0 | -9.5 | 8.2 | 18.7 | 24.7 | 10.2 | 8.9 | 17.1 | -4.1 |
| 825 | -2.3 | 14.6 | 7.2 | 13.6 | 24.5 | 8.1 | 6.5 | 10.0 | -3.6 | 23.7 | 22.1 | 10.5 | 8.7 | 14.4 | 9.1 | -1.7 |

valley loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 826 | -1.5 | 22.1 | 21.0 | 7.1 | 7.9 | 17.3 | 21.1 | 23.5 | -8.0 | 18.0 | 15.6 | 11.2 | 21.1 | 20.6 | 22.8 | -3.2 |
| 827 | -1.5 | 23.4 | 11.9 | 9.4 | 12.0 | 9.7 | 5.7 | 16.9 | -2.1 | 5.2 | 12.0 | 7.7 | 11.2 | 22.8 | 23.6 | -1.3 |
| 828 | -3.4 | 6.3 | 16.6 | 14.2 | 21.8 | 17.9 | 23.4 | 12.7 | -2.0 | 17.0 | 11.8 | 12.8 | 7.4 | 14.0 | 8.9 | -2.0 |
| 829 | -0.5 | 21.0 | 20.3 | 23.7 | 20.4 | 15.0 | 6.3 | 10.5 | -9.2 | 17.2 | 21.7 | 16.8 | 17.2 | 9.6 | 24.9 | -2.9 |
| 830 | -1.1 | 13.1 | 11.8 | 16.2 | 15.7 | 14.0 | 12.6 | 23.4 | -2.3 | 10.3 | 6.6 | 5.6 | 9.1 | 22.7 | 9.5 | -3.8 |
| 831 | -4.2 | 21.9 | 20.8 | 15.7 | 17.9 | 19.6 | 14.3 | 8.9 | -2.7 | 17.2 | 6.6 | 22.9 | 13.7 | 20.8 | 18.0 | -0.8 |
| 832 | -3.5 | 8.8 | 22.0 | 19.8 | 24.3 | 17.9 | 10.8 | 8.7 | -7.0 | 5.5 | 9.0 | 15.5 | 21.9 | 11.8 | 18.4 | -4.2 |
| 833 | -1.0 | 15.5 | 10.4 | 10.8 | 10.2 | 17.3 | 9.1 | 7.3 | -1.7 | 8.5 | 14.6 | 6.1 | 6.7 | 19.6 | 17.6 | -2.8 |
| 834 | -4.5 | 17.4 | 14.9 | 14.3 | 22.7 | 5.2 | 16.1 | 20.0 | -7.0 | 17.6 | 19.0 | 23.3 | 19.6 | 7.3 | 6.2 | -0.9 |
| 835 | -4.7 | 20.2 | 24.0 | 21.4 | 13.0 | 5.6 | 9.0 | 9.7 | -8.5 | 16.4 | 7.7 | 11.0 | 14.9 | 14.1 | 18.6 | -1.6 |
| 836 | -3.0 | 8.3 | 7.2 | 21.9 | 23.8 | 15.2 | 16.9 | 14.7 | -7.8 | 14.7 | 7.9 | 24.0 | 8.7 | 23.1 | 13.8 | -0.1 |
| 837 | -2.3 | 15.2 | 21.6 | 21.7 | 17.6 | 16.9 | 18.2 | 19.7 | -7.3 | 17.1 | 7.6 | 6.7 | 18.8 | 21.8 | 21.0 | -1.1 |
| 838 | -2.6 | 21.7 | 6.1 | 7.7 | 5.4 | 23.8 | 23.3 | 18.4 | -1.0 | 11.4 | 7.9 | 13.9 | 23.4 | 7.1 | 19.7 | -1.8 |
| 839 | -2.4 | 13.7 | 12.5 | 20.1 | 9.3 | 15.3 | 18.4 | 23.7 | -3.6 | 6.8 | 9.8 | 15.3 | 5.9 | 19.1 | 21.3 | -0.2 |
| 840 | -2.0 | 15.4 | 18.2 | 21.1 | 8.6 | 23.2 | 6.4 | 23.1 | -6.9 | 24.8 | 13.3 | 21.2 | 18.4 | 13.2 | 24.1 | -0.9 |
| 841 | -2.4 | 13.3 | 12.4 | 8.5 | 6.3 | 19.1 | 9.9 | 14.7 | -2.7 | 16.2 | 23.6 | 22.3 | 24.1 | 19.4 | 5.2 | -4.3 |
| 842 | -3.9 | 21.1 | 11.7 | 17.2 | 11.6 | 12.9 | 6.3 | 19.5 | -3.4 | 13.0 | 5.1 | 10.6 | 20.5 | 6.9 | 8.6 | -4.7 |
| 843 | -2.8 | 6.1 | 24.1 | 12.5 | 9.4 | 8.3 | 17.4 | 23.6 | -2.8 | 22.8 | 8.3 | 16.8 | 17.1 | 17.9 | 7.1 | -3.3 |
| 844 | -3.0 | 20.4 | 12.1 | 8.3 | 21.2 | 17.8 | 23.2 | 14.9 | -6.1 | 12.4 | 23.4 | 20.5 | 12.5 | 15.3 | 10.9 | -2.6 |
| 845 | -2.7 | 17.0 | 22.6 | 7.6 | 23.2 | 19.0 | 14.4 | 15.5 | -4.2 | 9.6 | 16.4 | 16.2 | 25.0 | 7.8 | 11.1 | -0.1 |
| 846 | -2.9 | 14.6 | 22.5 | 23.4 | 10.8 | 7.5 | 19.3 | 8.9 | -7.9 | 24.9 | 11.9 | 16.4 | 15.5 | 5.4 | 22.5 | -2.9 |
| 847 | -4.3 | 19.7 | 9.6 | 24.0 | 12.1 | 7.5 | 13.8 | 18.6 | -8.6 | 13.8 | 10.9 | 16.0 | 21.1 | 20.6 | 23.3 | -3.7 |
| 848 | -2.8 | 23.3 | 14.5 | 22.5 | 14.4 | 16.9 | 11.7 | 6.9 | -9.2 | 22.5 | 5.8 | 15.0 | 6.8 | 20.0 | 20.6 | -4.4 |
| 849 | -2.5 | 16.7 | 8.9 | 17.9 | 21.0 | 13.9 | 24.7 | 12.6 | -0.8 | 10.7 | 17.4 | 8.7 | 5.5 | 8.0 | 21.0 | -2.3 |
| 850 | -3.7 | 6.9 | 6.6 | 14.2 | 11.6 | 5.4 | 14.3 | 18.6 | -8.5 | 21.6 | 15.7 | 9.2 | 6.1 | 9.9 | 5.7 | -2.8 |
| 851 | -0.6 | 20.0 | 5.7 | 8.0 | 12.0 | 15.7 | 14.1 | 18.2 | -4.5 | 5.2 | 14.4 | 14.5 | 14.2 | 14.3 | 23.7 | -0.8 |
| 852 | -3.5 | 21.1 | 17.0 | 12.4 | 18.7 | 7.8 | 19.9 | 6.3 | -2.7 | 20.2 | 18.2 | 7.2 | 13.9 | 16.8 | 8.6 | -1.8 |
| 853 | -0.7 | 16.2 | 8.0 | 19.0 | 21.5 | 5.3 | 24.5 | 16.3 | -3.0 | 14.0 | 6.8 | 19.4 | 12.7 | 17.5 | 9.6 | -4.6 |
| 854 | -1.1 | 14.1 | 17.1 | 7.0 | 20.7 | 22.5 | 18.6 | 15.8 | -7.3 | 5.5 | 20.3 | 16.9 | 10.4 | 15.9 | 7.8 | -0.4 |
| 855 | -5.0 | 21.8 | 15.6 | 24.5 | 8.4 | 11.3 | 5.9 | 7.5 | -5.1 | 24.6 | 5.5 | 5.4 | 12.9 | 14.5 | 11.6 | -4.3 |
| 856 | -3.7 | 11.7 | 21.1 | 22.2 | 12.5 | 22.2 | 24.5 | 19.4 | -0.5 | 21.7 | 9.4 | 9.1 | 11.8 | 24.1 | 24.7 | -3.4 |
| 857 | -0.8 | 9.8 | 20.4 | 20.3 | 10.9 | 19.7 | 14.4 | 11.9 | -9.8 | 18.8 | 12.1 | 11.9 | 12.3 | 14.8 | 14.9 | -0.5 |
| 858 | -2.5 | 9.9 | 5.3 | 6.2 | 12.3 | 17.1 | 18.7 | 15.9 | -6.3 | 20.9 | 10.1 | 11.7 | 18.7 | 8.3 | 11.2 | -2.1 |
| 859 | -2.9 | 20.6 | 24.7 | 22.2 | 16.6 | 14.7 | 8.5 | 21.4 | -9.6 | 11.0 | 13.4 | 7.5 | 10.3 | 24.2 | 9.3 | -2.3 |
| 860 | -4.9 | 8.6 | 15.6 | 7.8 | 14.2 | 7.2 | 18.2 | 9.8 | -1.0 | 7.3 | 15.6 | 18.6 | 13.7 | 10.2 | 9.3 | -2.6 |
| 861 | -0.1 | 6.0 | 10.8 | 18.6 | 11.3 | 14.5 | 16.6 | 12.6 | -5.2 | 8.1 | 6.5 | 14.4 | 14.8 | 5.5 | 24.8 | -2.6 |
| 862 | -1.6 | 23.4 | 11.1 | 20.9 | 15.4 | 15.8 | 20.8 | 12.4 | -0.7 | 23.6 | 12.6 | 9.4 | 16.0 | 23.8 | 7.0 | -2.1 |
| 863 | -0.2 | 20.2 | 18.1 | 14.2 | 16.7 | 5.5 | 7.8 | 24.3 | -8.3 | 24.2 | 6.8 | 21.0 | 18.5 | 14.7 | 20.5 | -2.5 |
| 864 | -1.2 | 14.1 | 12.3 | 6.3 | 20.9 | 21.7 | 22.0 | 24.7 | -9.8 | 6.9 | 13.1 | 13.7 | 18.5 | 19.0 | 13.1 | -4.3 |
| 865 | -3.2 | 7.6 | 6.8 | 20.5 | 5.3 | 15.0 | 17.4 | 22.7 | -4.8 | 8.9 | 15.7 | 18.8 | 21.1 | 11.5 | 19.4 | -0.9 |
| 866 | -4.8 | 8.9 | 17.0 | 19.5 | 6.0 | 24.2 | 12.8 | 16.5 | -5.4 | 24.6 | 7.6 | 22.4 | 24.0 | 19.9 | 17.9 | -2.1 |
| 867 | -2.7 | 18.2 | 9.1 | 7.4 | 22.5 | 23.0 | 10.9 | 15.0 | -1.6 | 8.9 | 17.6 | 23.3 | 14.1 | 21.1 | 18.5 | -3.2 |
| 868 | -1.6 | 24.8 | 15.1 | 11.1 | 23.3 | 17.3 | 8.4 | 14.4 | -6.4 | 7.7 | 14.5 | 9.0 | 21.9 | 24.6 | 7.2 | -2.9 |
| 869 | -1.7 | 19.5 | 10.2 | 17.4 | 16.2 | 7.2 | 18.2 | 16.0 | -4.8 | 12.6 | 10.7 | 5.8 | 17.4 | 23.3 | 8.7 | -3.9 |
| 870 | -4.0 | 5.7 | 19.2 | 21.1 | 21.8 | 10.0 | 15.6 | 19.4 | -8.1 | 5.7 | 17.0 | 13.5 | 7.3 | 7.9 | 16.4 | -2.0 |
| 871 | -3.8 | 21.0 | 24.7 | 23.6 | 15.6 | 6.4 | 6.2 | 10.2 | -5.2 | 18.9 | 22.8 | 19.6 | 5.3 | 8.1 | 10.6 | -3.3 |
| 872 | -4.1 | 14.9 | 22.0 | 21.9 | 18.8 | 16.0 | 12.2 | 16.2 | -1.1 | 11.5 | 14.1 | 20.7 | 24.2 | 8.7 | 23.7 | -3.8 |
| 873 | -2.2 | 11.0 | 10.4 | 9.9 | 17.2 | 6.9 | 8.5 | 7.8 | -8.4 | 11.3 | 17.7 | 7.5 | 12.1 | 5.9 | 21.3 | -3.8 |
| 874 | -3.7 | 14.3 | 16.1 | 19.5 | 24.7 | 6.6 | 6.0 | 21.6 | -9.4 | 16.8 | 11.4 | 16.1 | 23.8 | 22.8 | 20.9 | -2.7 |
| 875 | -3.7 | 21.0 | 16.7 | 13.8 | 5.7 | 23.2 | 15.9 | 10.5 | -3.4 | 18.6 | 24.4 | 21.4 | 21.6 | 6.9 | 16.6 | -0.7 |
| 876 | -0.2 | 21.6 | 21.3 | 7.5 | 10.8 | 11.7 | 21.9 | 18.0 | -1.7 | 8.4 | 17.8 | 19.2 | 6.0 | 20.6 | 20.0 | -4.1 |
| 877 | -1.8 | 13.8 | 19.8 | 12.6 | 11.3 | 16.9 | 19.0 | 24.0 | -0.3 | 18.5 | 7.6 | 20.8 | 7.9 | 10.7 | 10.6 | -3.2 |
| 878 | -3.8 | 20.3 | 17.3 | 17.8 | 18.5 | 9.3 | 15.4 | 18.4 | -4.7 | 14.4 | 20.2 | 19.3 | 16.0 | 15.7 | 13.1 | -2.8 |
| 879 | -0.5 | 23.0 | 11.2 | 7.6 | 5.2 | 17.1 | 17.4 | 16.7 | -9.5 | 18.6 | 7.1 | 8.2 | 19.2 | 5.4 | 8.7 | -0.6 |
| 880 | -2.0 | 11.0 | 16.5 | 23.2 | 19.9 | 14.4 | 22.9 | 14.6 | -4.1 | 22.8 | 20.7 | 18.6 | 7.4 | 7.8 | 19.6 | -2.9 |
| 881 | -4.9 | 7.2 | 16.6 | 16.7 | 23.9 | 15.5 | 6.4 | 24.9 | -4.7 | 10.4 | 8.1 | 15.9 | 22.7 | 16.3 | 7.9 | -2.8 |
| 882 | -0.1 | 18.5 | 22.8 | 18.0 | 6.6 | 11.7 | 17.0 | 18.8 | -3.1 | 24.0 | 17.2 | 18.3 | 24.1 | 15.4 | 12.0 | -4.2 |
| 883 | -0.5 | 18.7 | 13.8 | 17.4 | 13.4 | 24.5 | 23.1 | 8.0 | -3.6 | 24.1 | 16.1 | 7.3 | 11.2 | 9.4 | 5.5 | -2.5 |
| 884 | -3.5 | 9.6 | 6.4 | 5.7 | 12.8 | 6.5 | 12.9 | 19.3 | -4.2 | 12.5 | 7.8 | 21.2 | 18.0 | 15.2 | 17.7 | -0.6 |
| 885 | -4.8 | 9.0 | 21.2 | 17.5 | 19.2 | 13.6 | 21.7 | 22.6 | -9.5 | 24.9 | 16.9 | 24.7 | 14.1 | 11.5 | 22.8 | -0.5 |
| 886 | -0.1 | 20.7 | 11.0 | 10.8 | 8.5 | 5.7 | 7.4 | 16.0 | -5.5 | 21.6 | 11.6 | 16.8 | 13.7 | 17.5 | 6.2 | -4.5 |
| 887 | -2.6 | 9.6 | 20.4 | 7.3 | 24.3 | 5.1 | 8.7 | 16.7 | -9.0 | 12.4 | 14.5 | 9.0 | 10.4 | 19.8 | 11.8 | -4.2 |
| 888 | -1.7 | 19.5 | 19.8 | 8.4 | 18.2 | 17.1 | 22.9 | 5.5 | -2.9 | 13.1 | 18.1 | 8.5 | 15.6 | 5.4 | 5.7 | -2.7 |
| 889 | -4.0 | 21.9 | 22.2 | 14.6 | 9.3 | 16.7 | 15.6 | 21.7 | -6.4 | 17.0 | 15.3 | 16.0 | 17.6 | 12.7 | 13.7 | -0.2 |
| 890 | -4.1 | 10.0 | 20.8 | 7.1 | 8.9 | 11.6 | 13.0 | 13.8 | -3.9 | 13.7 | 24.2 | 11.0 | 19.7 | 15.5 | 18.1 | -2.1 |
| 891 | -0.2 | 20.5 | 12.1 | 11.6 | 24.8 | 17.1 | 22.8 | 7.6 | -4.2 | 5.5 | 17.0 | 18.9 | 19.9 | 13.5 | 23.8 | -4.5 |
| 892 | -3.8 | 11.2 | 8.4 | 10.3 | 21.2 | 20.6 | 7.5 | 5.9 | -7.6 | 14.2 | 12.4 | 15.5 | 13.2 | 11.2 | 24.8 | -4.6 |
| 893 | -0.1 | 6.0 | 6.1 | 5.9 | 11.6 | 18.0 | 24.4 | 5.7 | -5.4 | 13.1 | 13.5 | 11.7 | 6.8 | 23.2 | 13.1 | -2.6 |
| 894 | -4.9 | 9.0 | 5.6 | 8.1 | 19.6 | 12.8 | 13.3 | 16.9 | -3.3 | 14.5 | 12.2 | 6.7 | 8.0 | 19.4 | 16.7 | -1.5 |
| 895 | -2.7 | 21.5 | 7.7 | 15.6 | 19.8 | 16.7 | 23.8 | 22.3 | -0.6 | 18.3 | 14.8 | 17.6 | 5.3 | 20.6 | 16.1 | -0.2 |
| 896 | -1.8 | 21.7 | 23.7 | 11.6 | 15.7 | 22.0 | 12.3 | 12.1 | -5.6 | 11.1 | 23.3 | 13.6 | 10.9 | 7.9 | 16.8 | -0.8 |
| 897 | -3.7 | 14.2 | 16.6 | 18.3 | 5.6 | 9.7 | 8.6 | 18.9 | -2.3 | 11.9 | 20.3 | 10.3 | 6.3 | 10.8 | 10.9 | -0.3 |
| 898 | -1.9 | 20.5 | 12.5 | 19.2 | 6.6 | 13.6 | 19.5 | 14.7 | -2.3 | 11.0 | 13.1 | 11.8 | 22.5 | 16.6 | 9.1 | -1.0 |
| 899 | -0.3 | 18.6 | 23.7 | 11.8 | 13.1 | 11.2 | 19.4 | 19.2 | -2.9 | 22.8 | 24.1 | 10.2 | 12.4 | 21.8 | 14.0 | -3.1 |
| 900 | -3.7 | 16.8 | 19.7 | 22.4 | 18.7 | 6.8 | 11.0 | 14.3 | -1.5 | 22.5 | 17.8 | 6.4 | 24.5 | 5.7 | 22.6 | -3.7 |

valley loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 901 | -4.8 | 13.0 | 11.7 | 11.3 | 13.0 | 8.0 | 6.6 | 9.1 | -8.5 | 16.2 | 17.3 | 7.0 | 14.6 | 12.9 | 14.5 | -2.5 |
| 902 | -2.6 | 15.6 | 22.2 | 23.0 | 14.9 | 7.2 | 24.3 | 18.4 | -6.2 | 21.1 | 19.2 | 21.2 | 22.8 | 19.4 | 9.5 | -1.3 |
| 903 | -2.7 | 14.5 | 21.9 | 24.8 | 14.2 | 16.9 | 16.1 | 21.0 | -1.1 | 10.6 | 17.0 | 18.0 | 11.1 | 24.1 | 16.9 | -3.7 |
| 904 | -4.1 | 23.4 | 22.7 | 5.8 | 6.1 | 13.9 | 17.8 | 20.0 | -3.8 | 23.2 | 24.4 | 12.9 | 9.8 | 15.2 | 16.4 | -1.3 |
| 905 | -4.9 | 15.7 | 18.0 | 13.5 | 11.8 | 12.3 | 5.1 | 24.2 | -0.4 | 10.6 | 17.7 | 22.1 | 12.2 | 15.5 | 20.8 | -2.1 |
| 906 | -0.1 | 21.7 | 15.7 | 6.5 | 6.4 | 15.7 | 24.8 | 12.2 | -3.1 | 24.8 | 5.5 | 14.5 | 12.3 | 7.1 | 13.9 | -1.6 |
| 907 | -3.4 | 15.7 | 23.8 | 10.8 | 7.4 | 9.5 | 14.2 | 7.6 | -0.1 | 14.0 | 12.9 | 23.8 | 25.0 | 16.7 | 14.3 | -1.3 |
| 908 | -4.3 | 13.6 | 19.4 | 9.3 | 17.2 | 12.8 | 24.8 | 16.2 | -7.2 | 12.6 | 14.4 | 12.1 | 7.1 | 12.1 | 19.9 | -2.0 |
| 909 | -3.6 | 23.9 | 7.0 | 23.9 | 13.8 | 17.3 | 17.5 | 5.5 | -3.2 | 12.7 | 17.9 | 5.3 | 12.7 | 23.4 | 9.0 | -4.6 |
| 910 | -4.6 | 17.6 | 16.8 | 23.9 | 16.5 | 22.9 | 5.4 | 14.4 | -5.3 | 22.2 | 13.2 | 20.1 | 16.5 | 11.7 | 17.7 | -0.6 |
| 911 | -3.2 | 13.7 | 13.9 | 17.9 | 8.7 | 17.4 | 24.9 | 15.9 | -9.6 | 22.2 | 23.1 | 16.5 | 14.5 | 22.3 | 12.4 | -3.3 |
| 912 | -3.9 | 16.0 | 9.2 | 10.0 | 10.2 | 19.3 | 14.1 | 16.3 | -3.9 | 7.4 | 23.2 | 7.4 | 5.2 | 15.1 | 12.4 | -0.5 |
| 913 | -0.8 | 5.7 | 7.4 | 22.0 | 20.9 | 12.2 | 9.0 | 16.0 | -8.8 | 16.9 | 18.2 | 13.3 | 14.7 | 10.7 | 17.7 | -1.6 |
| 914 | -2.7 | 22.1 | 19.4 | 13.4 | 6.4 | 17.2 | 21.7 | 6.9 | -6.2 | 14.4 | 19.7 | 20.6 | 12.5 | 15.3 | 6.8 | -3.0 |
| 915 | -3.8 | 17.5 | 9.2 | 8.0 | 6.9 | 9.0 | 11.4 | 15.8 | -8.2 | 19.3 | 22.2 | 10.3 | 20.8 | 14.2 | 20.9 | -4.8 |
| 916 | -1.4 | 9.8 | 6.6 | 10.9 | 14.1 | 5.9 | 7.4 | 22.4 | -3.4 | 21.8 | 11.6 | 11.4 | 11.8 | 22.0 | 13.4 | -2.2 |
| 917 | -1.0 | 10.6 | 11.8 | 11.5 | 6.5 | 13.2 | 14.5 | 22.1 | -1.1 | 5.1 | 13.6 | 11.7 | 21.1 | 12.6 | 10.9 | -0.5 |
| 918 | -1.3 | 17.4 | 24.6 | 16.2 | 15.2 | 5.7 | 15.7 | 11.2 | -4.2 | 14.0 | 24.1 | 8.8 | 18.9 | 6.1 | 6.7 | -1.1 |
| 919 | -3.1 | 19.6 | 16.2 | 22.9 | 24.2 | 13.5 | 6.6 | 14.4 | -9.0 | 9.2 | 19.1 | 16.8 | 19.9 | 20.0 | 19.2 | -1.1 |
| 920 | -1.4 | 7.6 | 16.8 | 18.4 | 19.9 | 20.6 | 9.8 | 18.3 | -4.2 | 22.4 | 5.9 | 5.6 | 22.9 | 14.2 | 7.5 | -2.8 |
| 921 | -4.8 | 13.1 | 21.4 | 5.5 | 9.6 | 17.0 | 22.3 | 15.4 | -1.6 | 21.1 | 10.2 | 16.1 | 13.0 | 24.1 | 7.4 | -2.4 |
| 922 | -0.9 | 11.5 | 19.2 | 14.3 | 8.1 | 8.9 | 11.1 | 9.3 | -9.7 | 21.1 | 11.5 | 21.4 | 17.1 | 16.9 | 6.7 | -0.8 |
| 923 | -3.0 | 5.4 | 21.8 | 21.3 | 10.6 | 10.6 | 9.5 | 8.7 | -9.3 | 10.1 | 6.1 | 14.5 | 7.8 | 19.6 | 13.2 | -3.1 |
| 924 | -4.8 | 6.8 | 22.1 | 11.9 | 11.8 | 12.5 | 12.6 | 16.0 | -3.0 | 14.7 | 11.2 | 17.2 | 6.2 | 17.9 | 9.9 | -1.9 |
| 925 | -2.4 | 22.0 | 9.7 | 22.4 | 17.4 | 20.2 | 19.5 | 11.2 | -9.6 | 16.5 | 17.0 | 12.7 | 15.7 | 17.9 | 6.3 | -2.1 |
| 926 | -1.4 | 19.5 | 22.6 | 13.0 | 21.1 | 14.7 | 20.2 | 7.3 | -0.2 | 12.6 | 21.8 | 18.5 | 13.3 | 13.5 | 6.3 | -0.3 |
| 927 | -4.5 | 17.3 | 7.0 | 7.8 | 13.3 | 17.4 | 6.6 | 5.4 | -0.6 | 13.8 | 7.6 | 12.4 | 8.1 | 22.3 | 11.9 | -4.4 |
| 928 | -2.9 | 7.4 | 10.8 | 7.4 | 18.0 | 21.0 | 12.5 | 23.6 | -7.4 | 12.5 | 24.5 | 21.9 | 7.4 | 14.9 | 11.0 | -0.7 |
| 929 | -1.8 | 20.4 | 15.3 | 8.9 | 13.3 | 12.3 | 13.0 | 8.0 | -8.2 | 24.5 | 23.6 | 24.1 | 19.5 | 16.3 | 6.6 | -2.9 |
| 930 | -2.7 | 5.3 | 22.0 | 9.4 | 8.5 | 7.8 | 9.4 | 21.9 | -0.9 | 23.4 | 20.9 | 11.3 | 8.9 | 24.2 | 18.6 | -1.8 |
| 931 | -3.3 | 11.8 | 17.6 | 23.3 | 10.3 | 16.3 | 6.5 | 15.5 | -1.3 | 5.9 | 7.5 | 10.3 | 23.7 | 21.0 | 15.6 | -4.0 |
| 932 | -3.6 | 21.2 | 14.5 | 22.5 | 7.9 | 24.1 | 16.9 | 23.4 | -8.4 | 5.9 | 21.7 | 11.8 | 17.3 | 6.2 | 6.9 | -1.5 |
| 933 | -5.0 | 12.7 | 17.2 | 24.6 | 14.5 | 23.1 | 19.2 | 11.7 | -9.2 | 6.2 | 7.2 | 8.4 | 12.3 | 13.1 | 21.4 | -2.4 |
| 934 | -2.4 | 21.0 | 15.4 | 23.8 | 6.0 | 19.6 | 5.3 | 11.5 | -4.7 | 23.0 | 19.1 | 16.1 | 20.3 | 24.4 | 10.3 | -3.9 |
| 935 | -4.1 | 9.5 | 8.5 | 24.8 | 15.9 | 12.1 | 13.2 | 9.5 | -5.9 | 15.1 | 10.1 | 20.6 | 20.7 | 7.0 | 6.1 | -3.2 |
| 936 | -0.7 | 20.7 | 6.6 | 5.7 | 21.8 | 19.6 | 21.2 | 13.9 | -1.6 | 6.2 | 20.1 | 18.3 | 6.2 | 8.4 | 17.2 | -3.6 |
| 937 | -2.3 | 13.4 | 16.9 | 24.9 | 8.8 | 6.5 | 21.4 | 22.2 | -6.0 | 20.3 | 24.6 | 23.9 | 16.9 | 15.5 | 8.4 | -4.9 |
| 938 | -4.0 | 5.6 | 18.5 | 16.6 | 19.7 | 24.7 | 8.6 | 23.4 | -4.3 | 16.6 | 7.6 | 11.0 | 5.1 | 16.5 | 13.5 | -3.7 |
| 939 | -1.7 | 5.7 | 16.0 | 11.5 | 22.1 | 20.9 | 13.4 | 6.1 | -8.1 | 17.2 | 23.6 | 11.8 | 18.9 | 11.9 | 14.0 | -0.3 |
| 940 | -2.6 | 5.7 | 20.3 | 14.7 | 10.1 | 9.1 | 13.5 | 20.9 | -3.2 | 18.3 | 8.1 | 22.7 | 14.1 | 21.1 | 20.1 | -1.3 |
| 941 | -0.5 | 11.8 | 18.9 | 12.4 | 14.1 | 17.5 | 16.5 | 5.3 | -0.4 | 16.9 | 22.1 | 8.9 | 13.7 | 9.7 | 6.3 | -4.0 |
| 942 | -3.2 | 21.7 | 8.0 | 15.7 | 10.2 | 23.5 | 8.0 | 14.3 | -5.3 | 24.1 | 9.4 | 7.3 | 21.6 | 5.8 | 20.8 | -2.6 |
| 943 | -1.6 | 13.0 | 7.4 | 23.0 | 14.2 | 17.3 | 22.3 | 17.0 | -6.9 | 12.7 | 18.2 | 16.2 | 17.7 | 24.3 | 23.1 | -1.2 |
| 944 | -3.3 | 17.6 | 20.3 | 12.8 | 12.0 | 5.6 | 13.3 | 24.4 | -3.7 | 22.4 | 15.7 | 8.2 | 21.7 | 15.1 | 19.2 | -4.9 |
| 945 | -2.6 | 5.1 | 24.0 | 10.9 | 23.2 | 18.9 | 12.9 | 24.7 | -9.3 | 23.7 | 12.6 | 16.6 | 10.5 | 9.9 | 24.2 | -2.5 |
| 946 | -0.5 | 14.6 | 21.5 | 10.0 | 18.4 | 18.9 | 8.7 | 22.4 | -6.8 | 9.6 | 6.7 | 21.0 | 7.2 | 11.5 | 9.8 | -1.6 |
| 947 | -3.8 | 19.5 | 7.5 | 8.6 | 21.0 | 7.4 | 12.6 | 16.3 | -1.4 | 9.7 | 22.7 | 17.1 | 23.5 | 16.1 | 15.9 | -0.2 |
| 948 | -1.4 | 22.4 | 13.9 | 14.5 | 11.3 | 23.3 | 15.0 | 22.3 | -1.2 | 20.0 | 17.4 | 20.1 | 10.6 | 7.2 | 8.6 | -0.5 |
| 949 | -4.8 | 10.7 | 7.3 | 9.0 | 14.2 | 8.2 | 23.5 | 24.2 | -8.9 | 13.3 | 21.2 | 18.3 | 9.5 | 12.9 | 6.5 | -4.2 |
| 950 | -5.0 | 22.4 | 11.8 | 20.8 | 7.0 | 20.8 | 11.8 | 18.6 | -7.0 | 17.6 | 16.6 | 16.5 | 5.4 | 8.8 | 14.8 | -1.5 |
| 951 | -4.4 | 15.6 | 19.6 | 12.5 | 22.4 | 7.0 | 9.9 | 8.4 | -9.5 | 22.8 | 8.6 | 24.8 | 5.5 | 18.3 | 5.8 | -5.0 |
| 952 | -2.7 | 24.4 | 11.8 | 18.4 | 17.0 | 24.1 | 22.3 | 24.9 | -1.5 | 19.1 | 8.2 | 12.3 | 16.3 | 24.4 | 10.4 | -2.8 |
| 953 | -1.5 | 17.3 | 16.5 | 7.8 | 19.1 | 7.0 | 9.1 | 24.0 | -1.8 | 22.1 | 11.6 | 11.6 | 11.0 | 5.8 | 6.1 | -1.2 |
| 954 | -4.2 | 15.9 | 10.4 | 23.7 | 5.6 | 8.2 | 23.0 | 15.9 | -9.8 | 12.3 | 13.3 | 23.7 | 12.9 | 20.7 | 13.1 | -1.8 |
| 955 | -0.4 | 19.4 | 15.8 | 9.5 | 8.7 | 15.8 | 6.8 | 5.7 | -9.1 | 20.7 | 6.9 | 6.8 | 8.2 | 16.9 | 21.3 | -2.7 |
| 956 | -0.2 | 19.1 | 24.9 | 9.7 | 6.7 | 13.3 | 12.2 | 23.2 | -1.4 | 13.5 | 6.6 | 24.0 | 14.4 | 8.6 | 11.2 | -2.8 |
| 957 | -0.2 | 16.3 | 6.5 | 19.7 | 20.9 | 10.4 | 16.5 | 21.9 | -6.4 | 15.3 | 5.3 | 15.9 | 22.2 | 6.5 | 18.6 | -2.3 |
| 958 | -0.7 | 19.2 | 8.3 | 13.5 | 15.6 | 10.0 | 21.7 | 9.8 | -6.2 | 22.4 | 7.3 | 23.1 | 21.4 | 10.8 | 18.6 | -5.0 |
| 959 | -1.2 | 24.3 | 8.1 | 20.1 | 24.4 | 20.4 | 15.9 | 9.8 | -8.0 | 23.9 | 21.2 | 20.6 | 23.7 | 20.3 | 12.2 | -2.6 |
| 960 | -2.3 | 16.0 | 11.6 | 9.6 | 19.9 | 20.9 | 10.0 | 22.7 | -0.3 | 5.7 | 24.6 | 23.5 | 7.7 | 19.5 | 18.7 | -4.5 |
| 961 | -4.5 | 13.7 | 12.6 | 6.1 | 19.9 | 9.6 | 11.4 | 16.7 | -5.0 | 9.1 | 16.7 | 24.6 | 20.6 | 20.0 | 6.0 | -1.6 |
| 962 | -2.2 | 7.3 | 13.4 | 11.8 | 18.7 | 6.0 | 8.2 | 15.6 | -4.1 | 24.5 | 8.7 | 5.6 | 20.8 | 19.1 | 15.2 | -1.6 |
| 963 | -3.1 | 9.5 | 18.2 | 9.1 | 10.1 | 20.9 | 17.0 | 20.2 | -6.2 | 7.6 | 5.1 | 15.4 | 6.5 | 24.8 | 18.7 | -3.6 |
| 964 | -0.2 | 18.5 | 18.5 | 9.4 | 21.9 | 12.7 | 23.0 | 20.0 | -4.8 | 7.0 | 24.8 | 21.5 | 21.5 | 10.0 | 15.8 | -2.1 |
| 965 | -3.0 | 13.6 | 13.5 | 20.1 | 15.1 | 9.5 | 6.5 | 12.3 | -9.5 | 15.1 | 19.3 | 22.4 | 9.5 | 19.9 | 7.5 | -4.5 |
| 966 | -3.8 | 22.3 | 19.0 | 12.7 | 12.6 | 22.9 | 5.3 | 11.6 | -2.1 | 16.1 | 9.0 | 16.6 | 6.6 | 12.4 | 23.2 | -2.6 |
| 967 | -3.1 | 7.9 | 6.5 | 10.3 | 10.6 | 10.7 | 12.9 | 15.6 | -0.7 | 5.9 | 8.1 | 16.4 | 15.3 | 5.9 | 21.0 | -1.3 |
| 968 | -3.8 | 8.4 | 10.0 | 5.1 | 11.1 | 24.2 | 17.7 | 15.2 | -3.8 | 9.1 | 22.0 | 8.6 | 15.6 | 16.0 | 7.6 | -2.8 |
| 969 | -4.0 | 17.4 | 18.4 | 14.1 | 13.3 | 13.7 | 24.2 | 20.0 | -2.8 | 23.2 | 19.5 | 24.5 | 7.5 | 7.4 | 5.6 | -2.6 |
| 970 | -0.7 | 5.6 | 23.8 | 5.8 | 11.9 | 11.1 | 22.4 | 24.6 | -8.0 | 23.7 | 19.3 | 7.3 | 17.2 | 5.7 | 17.0 | -2.5 |
| 971 | -0.9 | 19.5 | 13.4 | 20.6 | 8.5 | 12.6 | 18.8 | 24.5 | -9.5 | 20.5 | 16.2 | 20.4 | 16.5 | 11.2 | 8.6 | -2.8 |
| 972 | -0.3 | 9.2 | 21.1 | 24.5 | 5.8 | 12.7 | 12.8 | 16.6 | -3.3 | 5.3 | 7.7 | 18.7 | 20.3 | 7.0 | 8.2 | -0.9 |
| 973 | -4.7 | 24.6 | 6.7 | 5.3 | 12.1 | 25.0 | 18.0 | 21.1 | -0.9 | 5.3 | 18.9 | 17.0 | 20.0 | 22.2 | 23.5 | -3.1 |
| 974 | -3.9 | 18.4 | 8.5 | 21.8 | 14.9 | 19.1 | 24.4 | 16.5 | -3.6 | 23.1 | 24.1 | 5.4 | 8.5 | 14.8 | 14.7 | -2.4 |
| 975 | -2.4 | 21.0 | 16.0 | 23.8 | 13.9 | 21.3 | 22.5 | 11.0 | -9.1 | 22.9 | 20.0 | 19.5 | 21.6 | 7.1 | 15.4 | -4.0 |

valley loads for cycle #

| mission | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 976 | -4.3 | 16.2 | 7.9 | 15.2 | 23.7 | 22.5 | 13.2 | 20.9 | 0.0 | 18.3 | 16.5 | 23.7 | 9.7 | 9.8 | 20.8 | -0.9 |
| 977 | -4.0 | 13.8 | 5.3 | 15.6 | 23.8 | 11.5 | 14.6 | 10 9 | -4.5 | 19.2 | 8.0 | 19.7 | 7.6 | 13.6 | 19.9 | -4.7 |
| 978 | -1.5 | 6.3 | 18.8 | 12.7 | 11.8 | 11.1 | 24.1 | 24.2 | -6.0 | 24.5 | 24.8 | 22.2 | 20.6 | 19.5 | 20.9 | -3.5 |
| 979 | -4.7 | 9.6 | 12.0 | 9.7 | 11.4 | 21.2 | 22.7 | 12.0 | -0.7 | 7.3 | 8.5 | 19.4 | 23.1 | 10.0 | 15.7 | -0.2 |
| 980 | -3.1 | 9.4 | 19.4 | 8.1 | 10.5 | 20.5 | 12.7 | 21.1 | -8.7 | 24.4 | 9.8 | 20.9 | 17.6 | 22.8 | 22.1 | -1.9 |
| 981 | -2.6 | 12.3 | 18.7 | 17.4 | 21.9 | 22.4 | 12.3 | 23.0 | -6.6 | 23.3 | 21.9 | 15.1 | 20.0 | 15.2 | 5.9 | -1.6 |
| 982 | -3.7 | 16.8 | 8.0 | 5.9 | 11.5 | 10.5 | 14.3 | 21.9 | -9.5 | 9.5 | 19.7 | 19.4 | 7.1 | 15.8 | 20.5 | -0.8 |
| 983 | -0.9 | 13.7 | 17.9 | 9.8 | 21.6 | 11.8 | 21.5 | 24.7 | -7.3 | 20.9 | 9.8 | 5.8 | 8.6 | 7.7 | 8.3 | -0.7 |
| 984 | -1.2 | 5.5 | 6.3 | 7.6 | 12.5 | 20.0 | 12.4 | 10.2 | -7.8 | 25.0 | 6.3 | 6.8 | 16.3 | 8.4 | 12.4 | -1.6 |
| 985 | -1.2 | 11.3 | 5.6 | 16.5 | 23.5 | 22.9 | 22.2 | 20.7 | -7.5 | 21.9 | 23.3 | 23.0 | 7.2 | 21.6 | 17.8 | -3.2 |
| 986 | -2.5 | 20.0 | 12.7 | 11.0 | 21.0 | 23.5 | 21.9 | 20.4 | -3.1 | 24.4 | 9.4 | 23.6 | 20.7 | 23.1 | 15.7 | -3.0 |
| 987 | 0.0 | 19.5 | 10.3 | 10.2 | 23.3 | 24.7 | 22.1 | 20.6 | -5.2 | 22.9 | 19.7 | 22.5 | 23.3 | 9.1 | 6.9 | -1.2 |
| 988 | -3.7 | 17.3 | 15.3 | 15.5 | 21.1 | 25.0 | 21.6 | 22.8 | -0.1 | 21.6 | 20.0 | 17.7 | 5.7 | 15.5 | 23.9 | -0.9 |
| 989 | -2.2 | 13.7 | 16.1 | 10.9 | 24.7 | 20.5 | 23.1 | 23.1 | -9.4 | 15.6 | 17.6 | 9.8 | 17.8 | 20.2 | 9.2 | -3.6 |
| 990 | -0.6 | 10.4 | 14.3 | 16.9 | 23.2 | 22.4 | 24.2 | 21.9 | -1.7 | 5.0 | 20.9 | 20.1 | 8.1 | 24.7 | 21.3 | -3.9 |
| 991 | -3.3 | 10.6 | 12.4 | 19.5 | 24.4 | 20.4 | 22.9 | 21.8 | -7.9 | 17.6 | 8.6 | 21.9 | 21.6 | 15.3 | 24.3 | -4.2 |
| 992 | -3.1 | 18.4 | 18.6 | 12.0 | 22.4 | 23.9 | 20.7 | 21.0 | -9.7 | 9.5 | 20.2 | 17.8 | 22.0 | 6.2 | 19.5 | -2.0 |
| 993 | -4.6 | 10.0 | 13.3 | 13.5 | 21.3 | 24.3 | 22.1 | 24.2 | -9.3 | 23.4 | 18.4 | 6.7 | 7.5 | 20.8 | 6.5 | -4.1 |
| 994 | -2.1 | 11.0 | 10.9 | 17.6 | 22.9 | 20.0 | 23.7 | 23.6 | -2.7 | 24.8 | 6.5 | 16.1 | 23.9 | 8.4 | 21.6 | -0.3 |
| 995 | -1.2 | 13.3 | 18.6 | 18.3 | 23.2 | 24.0 | 20.6 | 22.3 | -4.7 | 9.2 | 23.0 | 21.8 | 22.1 | 16.5 | 18.2 | -4.4 |
| 996 | -2.0 | 11.4 | 14.0 | 18.1 | 21.6 | 24.5 | 24.0 | 24.3 | -4.8 | 19.3 | 17.2 | 6.3 | 7.6 | 23.2 | 23.5 | -4.5 |
| 997 | -0.6 | 11.6 | 18.3 | 19.3 | 23.5 | 24.0 | 22.0 | 20.9 | -2.7 | 20.5 | 23.3 | 24.7 | 15.9 | 22.0 | 20.6 | -4.5 |
| 998 | -0.6 | 15.6 | 17.2 | 15.0 | 22.3 | 22.1 | 21.2 | 21.1 | -5.0 | 23.9 | 17.5 | 8.7 | 9.7 | 23.1 | 5.1 | -4.6 |
| 999 | -0.4 | 10.4 | 15.3 | 17.5 | 24.6 | 21.7 | 24.2 | 21.0 | -4.1 | 15.4 | 18.9 | 23.7 | 6.2 | 21.4 | 24.7 | -4.6 |
| 1000 | -3.8 | 15.3 | 19.6 | 18.3 | 21.5 | 22.1 | 23.0 | 22.0 | -2.1 | 19.9 | 18.7 | 5.6 | 7.5 | 24.5 | 22.5 | -2.0 |

# APPENDIX D

## AEROSPACE VEHICLE LOAD AND TEMPERATURE SPECTRUM

The aerospace vehicle spectrum contains 100 missions. The missions are grouped in pairs containing a total of 319 load cycles and lasting 1 hour. The temperature profile for each mission pair remains the same. The maximum peak load in each mission is the only value that changes. These peak loads occur at cycle numbers 106 and 216 (load steps 8 and 19) in each mission pair.

The load spectrum was designed such that its exceedance curve matches the exceedance curve of a transport vehicle. The load-time history presented below is for 1 flight hour. The test spectrum block consists of 50 flight hours (100 missions). Each hour is identical to the one shown, except the maximum loads in each mission vary between 72.0 percent and 100.0 percent of limit load.

The full spectrum is listed for the first mission pair. Maximum peak loads are then listed for all 100 missions in terms of percent test load.

2 missions - 60 minutes (319 load cycles)

Mission 1

| Step # | Peak (%) | Valley (%) | IN 718 # of cycles | 6-2-4-2 Ti Temp. (F) | Temp. (F) | Cycle Time (sec) | Total Time (sec) |
|---|---|---|---|---|---|---|---|
| 1 | 71.8 | -20.0 | 1 | 360.0 | 300.0 | 120.00 | 120.00 |
| 2 | 74.1 | 50.0 | 1 | 960.0 | 800.0 | 120.00 | 240.00 |
| 3 | 45.2 | 40.0 | 50 | 1080.0 | 900.0 | 3.60 | 420.00 |
| 4 | 0.0 | 0.0 | 1 | 300.0 | 250.0 | 180.00 | 600.00 |
| 5 | 45.2 | 40.0 | 50 | 1080.0 | 900.0 | 3.60 | 780.00 |
| 6 | 72.3 | 46.0 | 1 | 1200.0 | 1000.0 | 120.00 | 900.00 |
| 7 | 74.1 | 50.0 | 1 | 1200.0 | 1000.0 | 36.00 | 936.00 |
| 8 | 92.0 | 50.0 | 1 | 1200.0 | 1000.0 | 36.00 | 972.00 |
| 9 | 74.1 | 50.0 | 1 | 1200.0 | 1000.0 | 36.00 | 1008.00 |
| 10 | 72.3 | 46.0 | 1 | 1200.0 | 1000.0 | 60.00 | 1068.00 |
| 11 | 45.2 | 40.0 | 50 | 1080.0 | 900.0 | 3.84 | 1260.00 |
| 12 | 0.0 | 0.0 | 1 | 300.0 | 250.0 | 180.00 | 1440.00 |
| 13 | 45.2 | 40.0 | 50 | 1080.0 | 900.0 | 3.84 | 1632.00 |
| 14 | 72.3 | -20.0 | 1 | 840.0 | 700.0 | 240.00 | 1872.00 |

Mission 2

| Step # | | | | | | | |
|---|---|---|---|---|---|---|---|
| 15 | 71.8 | -20.0 | 1 | 360.0 | 300.0 | 120.00 | 1992.00 |
| 16 | 74.1 | 50.0 | 2 | 960.0 | 800.0 | 150.00 | 2292.00 |
| 17 | 72.3 | 46.0 | 1 | 840.0 | 700.0 | 480.00 | 2772.00 |
| 18 | 74.1 | 50.0 | 1 | 1200.0 | 1000.0 | 36.00 | 2808.00 |
| 19 | 78.9 | 50.0 | 1 | 1200.0 | 1000.0 | 36.00 | 2844.00 |
| 20 | 74.1 | 50.0 | 1 | 1200.0 | 1000.0 | 36.00 | 2880.00 |
| 21 | 72.3 | 46.0 | 1 | 1200.0 | 1000.0 | 120.00 | 3000.00 |
| 22 | 45.2 | 40.0 | 100 | 1080.0 | 900.0 | 3.60 | 3360.00 |
| 23 | 72.3 | -20.0 | 1 | 840.0 | 700.0 | 240.00 | 3600.00 |

Figure D-1. Table of Peak and Valley Loads for the First and Second Aerospace Vehicle Missions

| mission | peak | mission | peak | mission | peak | mission | peak |
|---|---|---|---|---|---|---|---|
| 1 | 92.0 | 26 | 78.9 | 51 | 82.0 | 76 | 87.0 |
| 2 | 78.9 | 27 | 78.9 | 52 | 82.0 | 77 | 78.9 |
| 3 | 78.9 | 28 | 89.0 | 53 | 78.9 | 78 | 78.9 |
| 4 | 78.9 | 29 | 78.9 | 54 | 89.0 | 79 | 78.9 |
| 5 | 78.9 | 30 | 78.9 | 55 | 91.0 | 80 | 85.0 |
| 6 | 78.9 | 31 | 78.9 | 56 | 97.0 | 81 | 85.0 |
| 7 | 100.0 | 32 | 90.0 | 57 | 78.9 | 82 | 88.0 |
| 8 | 83.0 | 33 | 81.0 | 58 | 78.9 | 83 | 78.9 |
| 9 | 85.0 | 34 | 78.9 | 59 | 78.9 | 84 | 78.9 |
| 10 | 82.0 | 35 | 78.9 | 60 | 81.0 | 85 | 89.0 |
| 11 | 81.0 | 36 | 87.0 | 61 | 94.0 | 86 | 83.0 |
| 12 | 78.9 | 37 | 87.0 | 62 | 78.9 | 87 | 84.0 |
| 13 | 84.0 | 38 | 78.9 | 63 | 78.9 | 88 | 78.9 |
| 14 | 87.0 | 39 | 95.0 | 64 | 78.9 | 89 | 81.0 |
| 15 | 78.9 | 40 | 86.0 | 65 | 78.9 | 90 | 83.0 |
| 16 | 89.0 | 41 | 78.9 | 66 | 98.0 | 91 | 78.9 |
| 17 | 96.0 | 42 | 78.9 | 67 | 88.0 | 92 | 78.9 |
| 18 | 78.9 | 43 | 78.9 | 68 | 86.0 | 93 | 78.9 |
| 19 | 78.9 | 44 | 83.0 | 69 | 78.9 | 94 | 78.9 |
| 20 | 89.0 | 45 | 88.0 | 70 | 78.9 | 95 | 88.0 |
| 21 | 78.9 | 46 | 78.9 | 71 | 78.9 | 96 | 84.0 |
| 22 | 88.0 | 47 | 78.9 | 72 | 78.9 | 97 | 78.9 |
| 23 | 78.9 | 48 | 78.9 | 73 | 86.0 | 98 | 85.0 |
| 24 | 86.0 | 49 | 78.9 | 74 | 78.9 | 99 | 78.9 |
| 25 | 78.9 | 50 | 93.0 | 75 | 86.0 | 100 | 78.9 |

Figure D-2. Table of Mission Peak Loads for Aerospace Vehicle Spectrum

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