Stream Flow Monitoring Report II – Salmon Creek

Annex Creek/Salmon Creek Hydroelectric Project

(FERC Project No. 2307)

Alaska Electric Light and Power Company

Juneau, Alaska

August 16, 2017

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1. INTRODUCTION AND PURPOSE

In October 2015, Alaska Electric Light & Power (AEL&P) requested an amendment to its license that would allow the operation of the stream gage to be performed by the licensee. By Order issued December 30, 2015, the Federal Energy Regulatory Commission (FERC) approved the amendment and stipulated that a new stream flow plan be developed after consultation with Alaska Department of Fish and Game (ADF&G), National Marine Fisheries Service (NMFS), and the United State Fish and Wildlife Service (USFWS). AEL&P prepared a plan in consultation with ADF&G, NMFS, and USFWS, as well as with the Alaska Department of Natural Resources (ADNR) Water Division and National Weather Service (NWS).

By Order issued August 9, 2016 the FERC approved the stream flow monitoring plan with a requirement to file a instream flow monitoring report biannually to the FERC, NMFS, USFWS and ADF&G. The report is to review operation of the gage, identify when supplemental water was released and include information on the operation of the supplemental water valve. The report is to be submitted for agency review, with a 30-day review and comment period, prior to filing with the FERC. Documentation of agency consultation should be included in the report.

The first report was submitted for agency review on March 17, 2017 and the final version was submitted to FERC on April 19, 2017. The first report covered operation of the gage from April 27, 2016 to December 31, 2016. This report covers the period of operation from January 1, 2017 to June 30, 2017.

1.1. Gage Operation

The stream gage started operation on April 27, 2016, taking level measurements on a 15 minute basis. This data is automatically distributed to www.aelp.com/About-Us/Salmon-Creek-Streamflow where it is available for public display. The page has multiple graph options for quick review of the data. Real-time flow data is supplied directly to the AEL&P Supervisory Control and Data Acquisition (SCADA) System where it is logged and monitored. Alarms are automatically generated for low flow conditions or for loss of communication with the sensor.

The communication path between the gage and the AEL&P SCADA system is through a cellular phone modem, this link did have one short failure due to a power outage on June 12, 2017 which affected the area surrounding the gage location. Communication recovered when power was restored to the site. The datalogger is backed up by a 12VDC battery which allows the device to continue to collect data during a power loss, when communications were restored the data stored in the datalogger was amended to the datafile sent to NWS and the AEL&P website. So instantaneous data was not available for a short time, but no data was lost during the incident. The streamflow reading prior to communication failure was well above the 9CFS level and stream flow levels do not change quickly so there was no danger of a low flow violation during the communication outage.

Figures 1 and 2 below show the corrected discharge graphs for the first and second quarter of 2017. The corrections are due to stream icing which impacted operation of the gage, resulting in false high readings. In these instances the supplemental valve was opened to provide additional water flow in the stream as discussed in Section 1.3 below.

The dates of the manual discharge readings are identified in the figures. A total of four manual measurements were taken during the first half of 2016, during both normal and low flow conditions. Comments received from ADF&G on August 14, 2017 stated they would like to see the manual discharge measurements taken when flows are low (<25 CFS) to ensure the gage accuracy during periods of low flow. Since the primary function of this gage is to alert AELP to flows less than 9 CFS so that supplemental water can be added to the stream, this is a valid concern. AELP will try to take more discharge measurements during low flow periods. It should be noted, that low flow periods typically occur during the coldest winter periods and that AELP opens the supplemental valve when we reach 9 CFS and leaves it open until ambient temperatures are above freezing and flow measurements are above 12 CFS.

A table of the Daily Mean Discharge for the months of October 2016 through June 2017 is included in Appendix B.

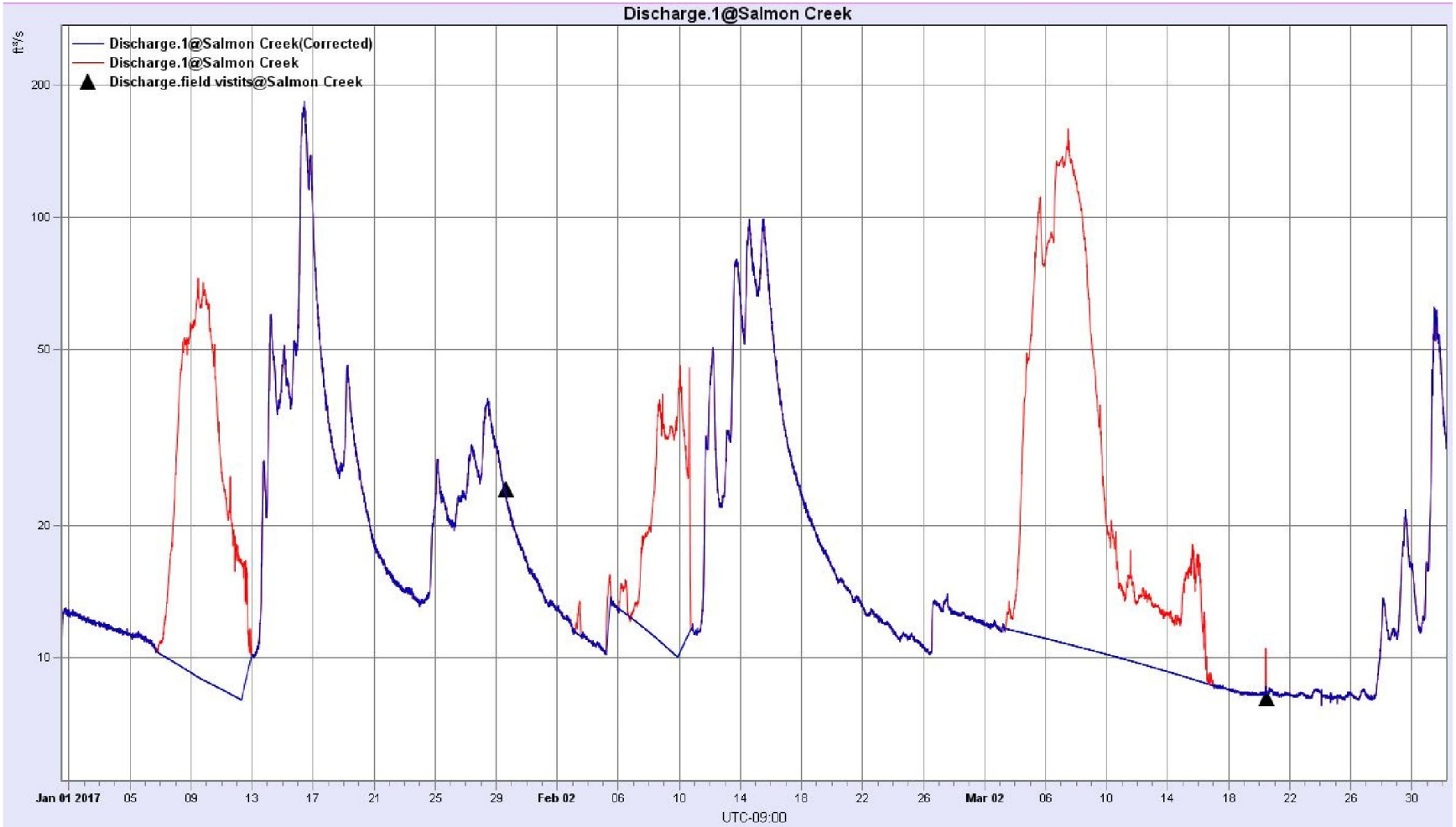

Figure 1 – First Quarter 2016 Corrected Discharge

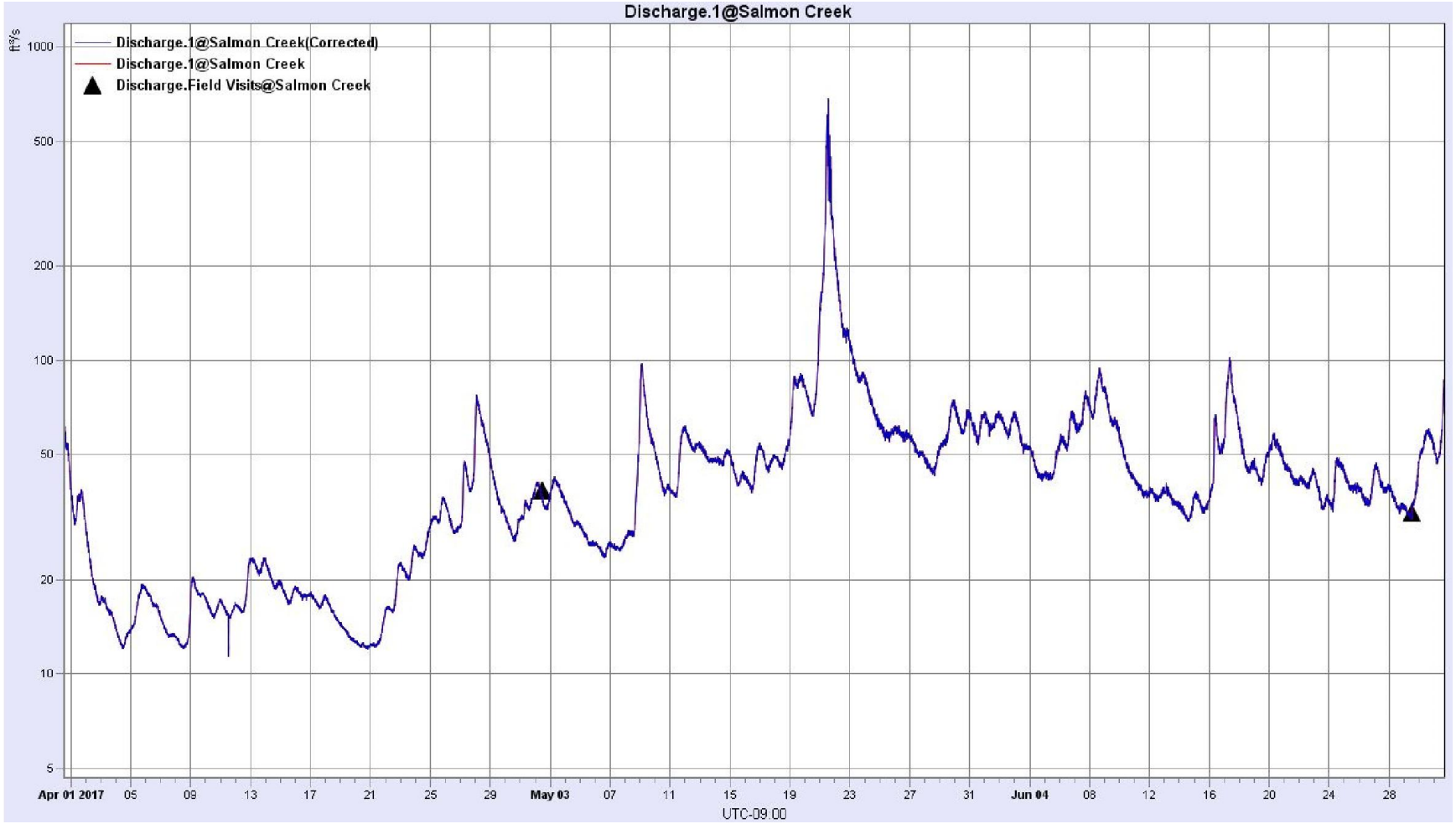

Figure 2 – Second Quarter 2016 Corrected Discharge

1.2. Supplemental Valve Operation

The supplemental water valve is a 6" valve tapped off of the penstock at the base of the dam. The valve discharges water directly into the natural drainage. Operation of the valve is performed remotely by the AEL&P System Operator who also has real-time indication of the streamflow. When the flow drops below 9CFS, an alarm is generated and the Operator opens the valve and logs the operation.

The valve is either open or closed, there are no intermediate positions. The Operator has feedback on the valve position, provided by limit switches which show the valve position as well as an analog signal which reflects valve position. In addition to valve position, there is a flowmeter on the outlet of the valve. The amount of flow through the valve when open varies with the lake elevation. At a higher elevation there is more flow and at a lower elevation the flow is less. The valve has been sized to ensure 3CFS of flow at a low lake elevation, so typically more CFS is discharged to the stream.

1.3. Supplemental Valve Release

Cold temperatures during the winter, resulted in low stream flow conditions as well as ice build-up around the sensor. The supplemental water valve was opened whenever the stream flow was shown to be less than 9CFS or if it was thought that the sensor reading was reading incorrectly due to icing. The procedure posted in the AEL&P SCADA system was updated to state that the supplemental valve should only be closed if the flow is above 12.5CFS **and** ambient temperatures are above freezing.

Valve Opened				Valve Closed			
Date	Time	Stream Flow (CFS)	Release Flow (CFS)	Date	Time	Stream Flow (CFS)	Release Flow (CFS)
12/31/16	10:05am	8.98	4.3	1/15/17	12:11	32.48	
2/5/17	2:27am	23-31	4.2	2/11/17	5:02pm	25.79	
2/26/17	10:15am	8.99	4.1	3/5/17	12:15am	43-102	
3/6/17	7:38am	80.25	4	3/29/17	7:58am	15.06	

Table 1 - Supplemental Valve Operation

1.4. Agency Consultation

A copy of the draft report with a request for consultation was sent on July 14, 2017 by Christy Yearous with AEL&P to ADF&G, USFWS and NMFS by e-mail. After the e-mail was sent, AELP received feedback from the National Weather Service that there were issues with collection of the CSV file from the AELP

website. The AELP website had been updated in May and the link to the old CSV file was not functioning, this issue was corrected immediately and data transfer restored. The data file and graphs are available on the updated AELP website, https://www.aelp.com/About-Us/Salmon-Creek-Streamflow.

A copy of the request for consultation and comments received are in Appendix A.

APPENDIX A: AGENCY COMMENTS

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From: Brockmann, Steve <steve_brockmann@fws.gov>
Sent: Monday, July 17, 2017 9:35 AM
To: Christy Yearous
Subject: Re: P-2307 Salmon Creek Semi-Annual Streamflow Report

Thank you, Christy. I am the correct contact for the U.S. Fish and Wildlife Service.

Steve Brockmann

On Fri, Jul 14, 2017 at 3:38 PM, Christy Yearous <Christy.Yearous@aelp.com> wrote:
Per the Salmon Creek Streamflow Monitoring Plan, AEL&P is required to submit semi-annual reports for the AEL&P operated Salmon Creek stream gage. Attached is the DRAFT semi-annual report for January 1 through June 30, 2017. Please provide comments to me via e-mail by August 15, 2017. I will incorporate any comments received and submit the report to FERC after the comment period has ended.

Operation of the gage has been going well. AEL&P did update the company website, the streamflow data can still be accessed from the old link. However, it can also be accessed in the ABOUT US menu from the home page, that will bring up https://www.aelp.com/About-Us/Salmon-Creek-Streamflow. In the drop down menu additional chart options are available for the previous 3 and 6 month periods.

Please confirm receipt of this e-mail, I want to make sure that we have the correct agency contacts in place.

Thank you,
Christy Yearous
AEL&P
463-6387

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Steve Brockmann
Southeast Alaska Coordinator
Juneau Field Office
U.S. Fish and Wildlife Service
3000 Vintage Blvd, Suite 201
Juneau, AK 99801

Office (907) 780-1181
cell (907) 723-7839
Fax (907) 586-7099

From: Crane Johnson - NOAA Federal <benjamin.johnson@noaa.gov>
Sent: Monday, July 17, 2017 11:17 AM
To: Christy Yearous
Subject: Re: Salmon Creek

That worked! Thanks.

If/when there are rating curve updates could you send them to us as well.

Crane

On Mon, Jul 17, 2017 at 10:48 AM, Christy Yearous <Christy.Yearous@aelp.com> wrote:
Sorry, I didn't realize that it would impact you. Our website was updated in May (the old link was supposed to work though). The file is at:

https://www.aelp.com/Portals/0/Assets/WeatherCam/SalmonCreek.csv

If that doesn't work, you can get to the file from: https://www.aelp.com/About-Us/Salmon-Creek-Streamflow. It is the top of the download list.

Please let me know if I can provide any additional information.

Thanks,
Christy

From: Crane Johnson - NOAA Federal [mailto:benjamin.johnson@noaa.gov]
Sent: Monday, July 17, 2017 10:46 AM
To: Christy Yearous <Christy.Yearous@aelp.com>
Cc: Aaron. Jacobs <Aaron.Jacobs@noaa.gov>
Subject: Salmon Creek

Hi Christy,

We stopped ingesting the Salmon Creek data in May of this year. Prior to that everything was working well on our end.

The link we have for the data file is:

http://www.aelp.com/sc/SalmonCreekStream_Flow.csv This does not appear to be working any more. Is there a new link we can point to ingest the data on our end.

Thanks,
Crane
--
Crane Johnson, P.E.
Service Coordination Hydrologist
NWS Alaska Pacific River Forecast Center
benjamin.johnson@noaa.gov

907.266.5158

http://aprfc.arh.noaa.gov/

--
Crane Johnson, P.E.
Service Coordination Hydrologist
NWS Alaska Pacific River Forecast Center
benjamin.johnson@noaa.gov
907.266.5158

http://aprfc.arh.noaa.gov/

From: Keith, Kevin D (DFG) <kevin.keith@alaska.gov>
Sent: Monday, August 14, 2017 10:11 AM
To: Christy Yearous
Subject:** EXTERNAL ** RE: P-2307 Salmon Creek Semi-Annual Streamflow Report

Hello Christy,

Thank you for the phone call today. It was good to talk to you.

The Alaska Department of Fish & Game appreciates the opportunity to comment on the draft report covering the Salmon Creek streamgage from January 1 to June 30, 2017. The report looks good and the operation of the streamgage appears to be going quite well. Because our primary concern is with the accuracy of the streamgage at low flows, we would encourage you (as much as is practical) to take the discharge measurements when flows at the gage are low (say, less than 25 cfs).

I look forward to working with you.

Kevin

Kevin D. Keith
FERC Hydropower Coordinator
Statewide Aquatic Resources Coordination Unit
Alaska Department of Fish & Game

907-267-2836

From: Christy Yearous [mailto:Christy.Yearous@aelp.com]
Sent: Friday, July 14, 2017 4:41 PM
To: Keith, Kevin D (DFG)
Subject: P-2307 Salmon Creek Semi-Annual Streamflow Report

Per the Salmon Creek Streamflow Monitoring Plan, AEL&P is required to submit semi-annual reports for the AEL&P operated Salmon Creek stream gage. Attached is the DRAFT semi-annual report for January 1 through June 30, 2017. Please provide comments to me via e-mail by August 15, 2017. I will incorporate any comments received and submit the report to FERC after the comment period has ended.

Operation of the gage has been going well. AEL&P did update the company website, the streamflow data can still be accessed from the old link. However, it can also be accessed in the ABOUT US menu from the home page, that will bring up https://www.aelp.com/About-Us/Salmon-Creek-Streamflow. In the drop down menu additional chart options are available for the previous 3 and 6 month periods.

Please confirm receipt of this e-mail, I want to make sure that we have the correct agency contacts in place.
Thank you,
Christy Yearous
AEL&P
463-6387

APPENDIX B: OCTOBER 2016 – JUNE 2017 DAILY MEAN DISCHARGE

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Daily Mean by Year

Salmon Creek Daily Mean Discharge

Identifier: Discharge.1@Salmon Creek
Location: Salmon Creek Juneau
Units: ft^3/s
Filter: None

Year: 2016 **Aggr:** * **Min:** * **Max:** *

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	25 UN	11 UN	19 UN	12 UN	13 UN	12 UN	34 UN	34 UN	64 UN	68 UN	* UN	* UN
2	22 UN	12 UN	67 UN	12 UN	12 UN	12 UN	21 UN	37 UN	62 UN	98 UN	* UN	* UN
3	20 UN	24 UN	98 UN	12 UN	11 UN	12 EF	16 UN	39 UN	57 UN	120 UN	* UN	* UN
4	19 UN	33 UN	38 UN	11 UN	11 UN	11 EF	13 UN	32 UN	46 UN	75 UN	* UN	* UN
5	17 UN	59 UN	25 UN	11 UN	12 EF	11 EF	17 UN	27 UN	45 UN	58 UN	* UN	* UN
6	16 UN	31 UN	20 UN	11 EP	13 EF	11 EF	17 UN	25 UN	59 UN	53 UN	* UN	* UN
7	15 UN	27 UN	19 UN	9.9 EP	12 EF	11 EF	14 UN	25 UN	68 UN	45 UN	* UN	* UN
8	14 UN	51 UN	17 UN	9.5 EP	11 EF	10 EF	13 UN	34 UN	78 UN	40 UN	* UN	* UN
9	13 UN	64 UN	15 EP	9 EP	10 EF	10 EF	19 UN	69 UN	67 UN	60 UN	* UN	* UN
10	13 UN	76 UN	14 EP	8.6 EP	11 UN	10 EF	16 UN	42 UN	48 UN	51 UN	* UN	* UN
11	12 UN	120 UN	13 EP	8.3 EP	19 UN	9.8 EF	16 UN	46 UN	39 UN	55 UN	* UN	* UN
12	12 UN	95 UN	14 EP	8.8 UN	31 UN	9.6 EF	18 UN	55 UN	37 UN	51 UN	* UN	* UN
13	12 UN	65 UN	16 EP	16 UN	53 UN	9.4 EF	22 UN	50 UN	36 UN	* UN	* UN	* UN
14	11 UN	63 UN	15 EP	43 UN	74 UN	9.2 EF	20 UN	49 UN	33 UN	* UN	* UN	* UN
15	11 UN	43 UN	14 EP	45 UN	77 UN	9 EF	18 UN	43 UN	35 UN	* UN	* UN	* UN
16	12 UN	33 UN	13 UN	130 UN	43 UN	8.7 UN	18 UN	44 UN	51 UN	* UN	* UN	* UN
17	17 UN	27 UN	15 UN	55 UN	27 UN	8.6 UN	17 UN	48 UN	77 UN	* UN	* UN	* UN
18	37 UN	23 UN	17 UN	29 UN	21 UN	8.4 UN	16 UN	49 UN	49 UN	* UN	* UN	* UN
19	32 UN	20 UN	19 UN	34 UN	17 UN	8.3 UN	13 UN	81 UN	45 UN	* UN	* UN	* UN
20	31 UN	18 UN	20 UN	22 UN	15 UN	8.3 UN	12 UN	81 UN	53 UN	* UN	* UN	* UN
21	23 UN	16 UN	24 UN	17 UN	14 UN	8.2 UN	13 UN	300 UN	43 UN	* UN	* UN	* UN
22	26 UN	16 UN	15 UN	15 UN	13 UN	8.2 UN	18 UN	150 UN	42 UN	* UN	* UN	* UN
23	25 UN	16 UN	12 UN	14 UN	12 UN	8.3 UN	22 UN	94 UN	37 UN	* UN	* UN	* UN
24	19 UN	15 UN	11 UN	15 UN	11 UN	8.2 UN	25 UN	73 UN	42 UN	* UN	* UN	* UN
25	16 UN	14 UN	10 UN	23 UN	11 UN	8.2 UN	32 UN	59 UN	40 UN	* UN	* UN	* UN
26	15 UN	14 UN	12 UN	22 UN	12 UN	8.2 UN	30 UN	58 UN	37 UN	* UN	* UN	* UN
27	14 UN	14 UN	13 UN	27 UN	13 UN	8.6 UN	41 UN	52 UN	41 UN	* UN	* UN	* UN
28	13 UN	13 UN	15 UN	33 UN	13 UN	12 UN	62 UN	47 UN	36 UN	* UN	* UN	* UN
29	12 UN	27 UN	11 UN	25 UN		16 UN	38 UN	61 UN	35 UN	* UN	* UN	* UN
30	12 UN	30 UN	13 UN	18 UN		13 UN	29 UN	64 UN	55 UN	* UN	* UN	* UN
31	11 UN		12 UN	15 UN		42 UN		62 UN		* UN	* UN	
Aggr	18	36	21	23	21	11	22	62	49	*	*	*
Min	11	11	9.8	8	10	7.8	11	23	31	*	*	*
Max	54	170	160	180	99	63	78	680	100	*	*	*

Date Processed: July 14, 2017 11:50