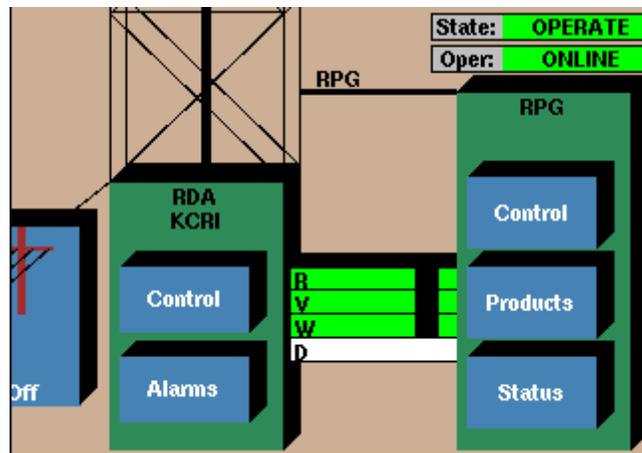


# RPG Build 12.0 Training



Presented by the  
Warning Decision Training Branch

## Overview

RPG Build 12.0 upgrades RPG software primarily in preparation for the deployment of Dual Polarization (Dual Pol), aka RDA Build 12.0.

**Note:** As of this writing, Dual Pol development is ongoing and there will be additional changes coming with RPG Build 12.1. Schedules and future build content in this document are subject to change!

## Electronic Performance Support System (EPSS)



The EPSS has been updated to support RPG Build 12.0. It provides step by step “reminders” for performing RPG tasks that may be familiar, but not done often enough for most users to remember all the steps. If you haven’t used the EPSS in awhile, check it out! You can access it directly from the MSCF by selecting the “lifesaver” icon.

## RPG Build 12.0 Impacts

The RPG Build 12.0 Human Computer Interface (HCI) is designed to support Dual Pol. Changes have been made to various windows prior to the Dual Pol upgrade. Once the RPG is connected to a Build 12.0 (Dual Pol) RDA, the behavior of these HCI changes will be more apparent. Additional training in using the RPG to optimize Dual Pol performance will be included in the Dual Pol Operations Course.

The Dual Pol related changes on the RPG HCI fall into three general categories:

- Wideband connection on HCI main page has a channel for the Dual Pol variables,
- Changes to VCP definitions to support Dual Pol base data processing, and

- Adjustments to algorithm parameters to support Dual Pol product generation.

The changes with RPG Build 12.0 that are not dependent on RDA Build 12.0 (Dual Pol) being activated are

- Legacy Mesocyclone algorithm and products removed
- Mesocyclone Detection Algorithm (MDA) modified to ingest Super Resolution base data
- Fix for using 360° azimuth when defining Exclusion Zones for the legacy Precipitation Processing System (PPS)
- 8bit Spectrum Width available for all elevations

1. Identify the change to the RPG (Remote) VCPs that supports the Dual Pol upgrade.
2. Identify the two Dual Pol algorithms that appear on the RPG Algorithms window.
3. Identify which legacy RPG algorithm and products are removed, and the remaining algorithm that provides the same type of decision support.
4. Identify the change to input data for the Mesocyclone Detection Algorithm (MDA) and the expected results.

There is one change related to narrowband communications that will be implemented when RPG Build 12.1 is deployed. As of this writing, RPG Build 12.1 is expected to be deployed November to December 2010. Since it may involve some advance planning, an overview is provided as part of this training.

With the implementation of Dual Pol, the number of products generated by each RPG increases sig-

## Objectives

## Narrowband Communications to Supplemental Users

Bandwidth is a Limited Commodity.	nificantly. RPG Build 12.1, in preparation for Dual Pol, has changes related to narrowband communications.
<b>Dual Pol Related RPG HCI Changes</b>	<p>The RPG Build 12.1 change controls the bandwidth to two different types of users to any given RPG. Those types are Primary and Supplemental, and the difference is based on the need for access to products.</p> <p><b>Primary</b> users (those WFO RPGs that perform product central collection) and WFOs that need access for Service Backup operations have the highest need for access to products.</p> <p>The other group of uses are called <b>Supplemental</b>. A supplemental user has a dedicated connection to an RPG, but that user's AWIPS is <b>not</b> sending that RPG's products for central collection. Supplemental users have a lower priority need for products and <b>may</b> see an increase in narrowband loadshedding.</p> <p>There will be additional information on this topic with the RPG Build 12.1 training.</p> <p>The Build 12.0 changes to the RPG HCI are on the following windows:</p> <ul style="list-style-type: none"><li>• RPG HCI Main Page</li><li>• Clutter Regions Editor</li><li>• RPG (Remote) VCPs</li><li>• RPG Control</li><li>• Product Generation Table</li><li>• Edit Selectable Product Parameters</li><li>• Algorithms</li></ul>

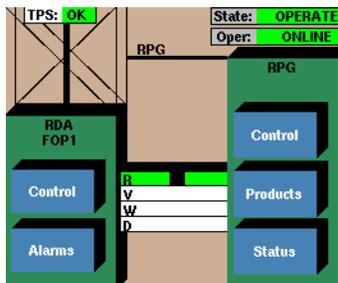
**RPG HCI Main Page**

The wideband connection status label on the RPG HCI main page has been previously represented as three channels between the RDA and the RPG, one for each of the three Base Moments (Reflectivity, Velocity and Spectrum Width). With RPG Build 12.0, an additional channel is added to depict the flow of the Dual Pol data. For each of these channels, there are two options for display. If the data are flowing, the bar is green with the animated black box. If the data are not flowing, the channel is white.

Wideband Connection Status

When Dual Pol is enabled, the Dual Pol data will be generated using the Contiguous Surveillance (CS) rotation for the Split Cut elevations. This is done to avoid the problem of data loss due to range folding and the need to “unfold” the Dual Pol data. Since there are no Dual Pol data yet available, the CS rotations for the Split Cuts are represented as green with the animated box for R and white for the other channels (Figure 1).

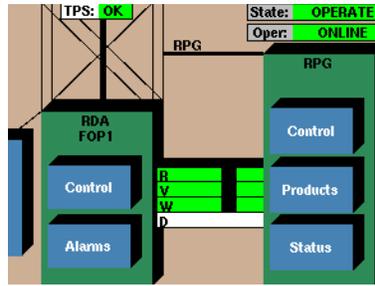
Until Your RDA is Upgraded to Dual Pol



**Figure 1.** RPG Build 12.0 wideband link for the CS rotation of a Split Cut elevation (until Dual Pol is installed).

For the Contiguous Doppler (CD) rotations within the Split Cuts, only the D channel is shown in white (Figure 2). This is also the appearance of this link for all the elevations above the Split Cuts.

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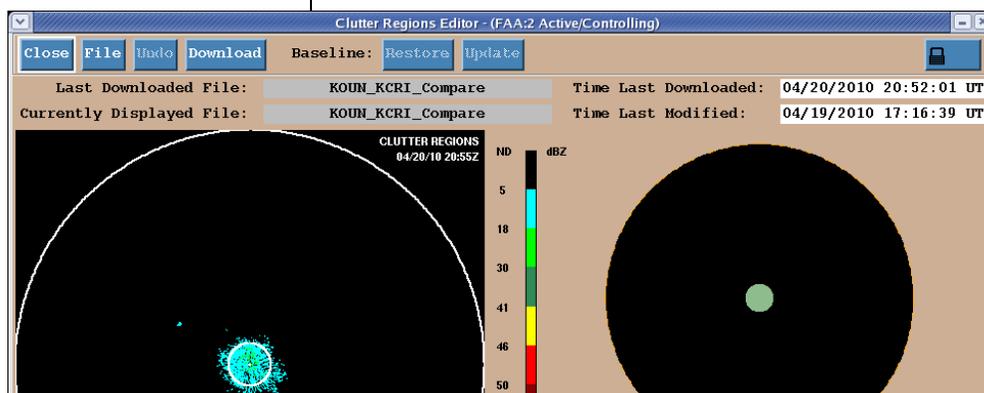


**Figure 2.** RPG Build 12.0 wideband link for CD rotations and elevations above the Split Cuts (until Dual Pol is installed).

### Clutter Regions Editor Window

There is new information along the top of the Clutter Regions Editor window. The name of the clutter file last downloaded to the RDA is displayed, along with the date and time. The name of the file which is currently displayed in this window is provided, along with the date and time that file was last modified.

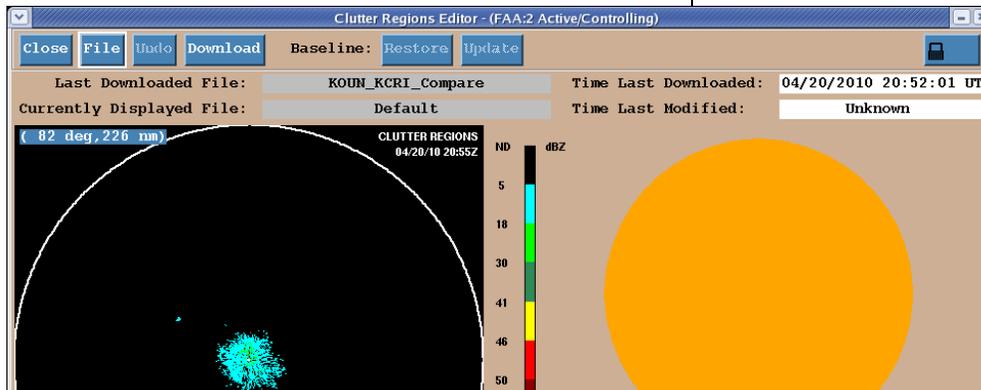
In Figure 3, the file that was last downloaded to the RDA is the same file that is currently displayed. This file, KOUN\_KCRI\_Compare, defines a particular clutter suppression configuration that was used for *testing* the Dual Pol prototype. It defines a region of All Bins clutter filtering out to a range of 25 nm. This is *not* recommended for operational use!



**Figure 3.** The name, time, and date of the clutter file last downloaded to the RDA, and the file currently displayed are listed at the top. In both cases, the file is KOUN\_KCRI\_Compare.

In Figure 4, KOUN\_KCRI\_Compare remains the file that was last downloaded to the RDA. How-

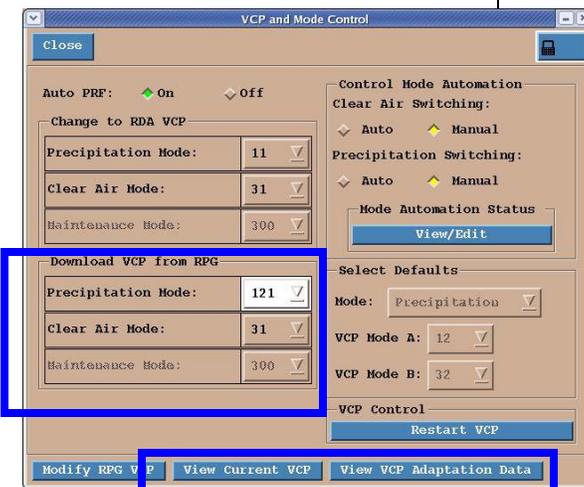
ever, the Default file is what is currently being displayed. The Default file has the Bypass Map in control out to the maximum range and over all elevations. Since the Default is not editable, the Time Last Modified is Unknown.



**Figure 4.** KOUN\_KCRI\_Compare is the file last downloaded, while Default is the file currently displayed. Since Default is not editable, the Time Last Modified is Unknown.

From the VCP and Mode Control window (Figure 5), you can examine the Current VCP (View Current VCP button) as well as the VCPs stored at the RPG (View VCP Adaptation Data button). With RPG Build 12.0, each of the VCP files has been edited to support Dual Pol.

### RPG (Remote) VCPs



**Figure 5.** VCP and Mode Control window. The Current and RPG stored VCPs can be viewed from this window.

A new column has been added to all RPG VCPs, whether they are accessed from “View Current

## Warning Decision Training Branch

VCP” or “View VCP Adaptation Data”. The new column is DP for Dual Polarization, identifying the portion of the VCP where the RDA calculates the DP variables.

View VCP Adaptation Data (on eagle.wdtb.noaa.gov)

VCP Selection: 11 12 21 31 32 121 211 212 221 300

Show: PRF# RMAX (NM) Velocity Increment: 0.97 kts

Elevation		Scan		DP	SR	Waveform	Sector 1		Sector 2		Sector 3		Sig
#	Deg	Sec	Y/N	Y/N	Type	Azm	PRF #	Azm	PRF #	Azm	PRF #	Refl	Vel
1	0.5	17	Y	Y	CS/W	0.0	1	0.0	1	0.0	1	2.0	2.0
2	0.5	14	N	Y	CD/W	30.0	5	210.0	5	335.0	5	3.5	3.5
3	0.9	17	Y	Y	CS/W	0.0	1	0.0	1	0.0	1	2.0	2.0
4	0.9	14	N	Y	CD/W	30.0	5	210.0	5	335.0	5	3.5	3.5
5	1.3	17	Y	Y	CS/W	0.0	1	0.0	1	0.0	1	2.0	2.0
6	1.3	14	N	Y	CD/W	30.0	5	210.0	5	335.0	5	3.5	3.5
7	1.8	15	Y	N	B	30.0	5	210.0	5	335.0	5	3.5	3.5
8	2.4	14	Y	N	B	30.0	5	210.0	5	335.0	5	3.5	3.5
9	3.1	14	Y	N	B	30.0	5	210.0	5	335.0	5	3.5	3.5

Azimuth Range: (0 to 359.9 Deg) - SNR Range: (-12.0 to 20.0 dB)

Figure 6. VCP 12 definition file at the RPG. Note the columns for SR (Super Res) and DP (Dual Pol).

The Y or N in the DP column (Figure 6) tells you whether or not the Dual Pol variables will be provided by the RDA for the particular elevation cut and waveform. For the Split Cut elevations, the Dual Pol variables are computed using the Surveillance (CS, low PRF) scan. Thus, there is an N in the DP column for the Doppler (CD, high PRF) scans of the VCP 12 Split Cut elevations (0.5°, 0.9°, and 1.3°). For the Batch and higher elevations, there is a Y in the DP column since the Dual Pol variables are computed for all these elevations.

### RPG Control

The Dual Pol upgrade includes a new rainfall estimation algorithm, known as the Quantitative Precipitation Estimation (QPE) Algorithm. The QPE will **not** replace the existing Precipitation Processing System (PPS), and all the familiar pre-Dual Pol rainfall products will continue to be generated.

The PPS accumulates rainfall while the Snow Accumulation Algorithm accumulates snow depth and snow water equivalent. Each of these algorithms has an option to reset their accumulations to zero at the RPG. With RPG Build 12.0, there is also an option to reset the Dual Pol QPE accumulations (Figure 7).

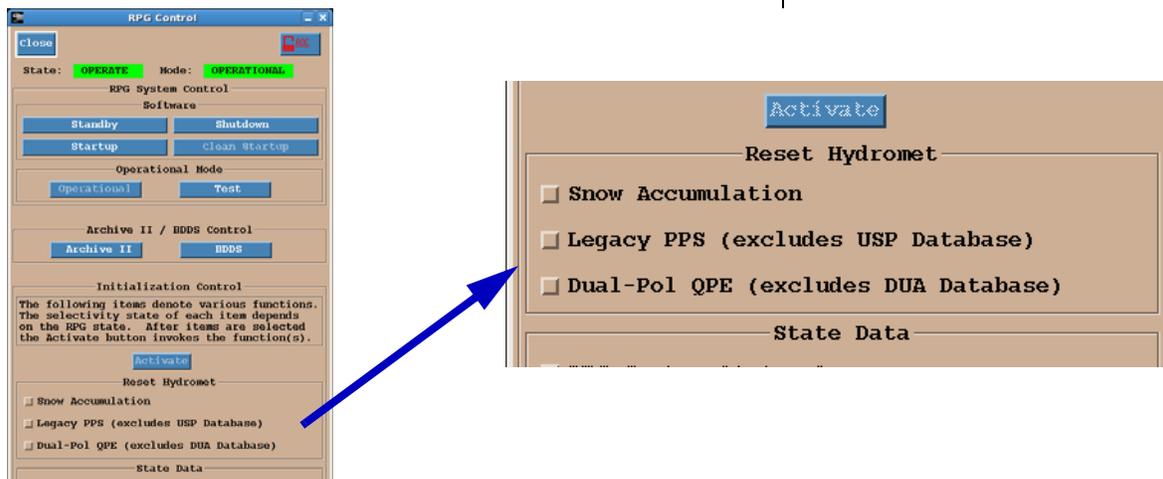


Figure 7. RPG Control window with a reset for the Dual Pol QPE Algorithm.

**Note:** During the RPG Build 12.0 Beta Test, it was discovered that when the Legacy PPS was reset, there was *no* feedback message on the RPG HCI. The reset *was* successful, and the feedback message will return with RPG Build 12.1!

The Dual Pol upgrade at the RDA will result in an updated Level II data stream. The Dual Pol base data will be used at the RPG to generate the suite of Dual Pol products. The new Dual Pol products are listed on the RPG Build 12.0 Generation Table, occupying product numbers 158 through 177.

Figure 8 has an example of a Current Generation Table with the Dual Pol variable products emphasized. These can be thought of as the Dual Pol “base products”. There is Differential Reflectivity (ZDR), Correlation Coefficient (CC), and Specific

## Product Generation Table

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Differential Phase (KDP). Each of these products has an 8bit version, DZD, DCC, and DKD, respectively.

Code	Gen	(mins)	Elev/Cut(s)	Product Description
ZDR	158	1	180	Differential Reflectivity Product: 16 level/0.54 nm
DZD	159	1	180	Differential Reflectivity Data Array Product: 256 level/0.13 nm
CC	160	1	180	Correlation Coefficient Product: 16 level/0.54 nm
DCC	161	1	180	Correlation Coefficient Data Array Product: 256 level/0.13 nm
KDP	162	1	180	Specific Differential Phase Product: 16 level/0.54 nm
DKD	163	1	180	Specific Differential Phase Data Array Product: 256 level/0.13 nm

Figure 8. RPG Build 12.0 current generation table with the new Dual Pol variable products.

Figure 9 has an example of a Current Generation Table with the Dual Pol products from the Hydrometeor Classification Algorithm (HCA) and the Melting Layer Detection Algorithm (MLDA) emphasized.

Code	Gen	(mins)	Elev/Cut(s)	Product Description
HC	164	1	180	Hydrometeor Classification Product: 16 level/0.54 nm
DHC	165	1	180	Hydrometeor Classification Data Array Product: 256 level/0.13 nm
ML	166	1	180	Melting Layer Contours: 4 contours/0.13 nm

Figure 9. RPG Build 12.0 current generation table with the new Dual Pol HCA and MLDA products.

Figure 10 has an example of a Current Generation Table with the Dual Pol products from the QPE Algorithm emphasized. Rainfall estimation is a major component of Dual Pol, and there are nine new products associated with the QPE Algorithm.

Code	Gen	(mins)	Elev/Cut(s)	Product Description
OHA	169	1	180	Dual Pol One Hour Accumulation 16 Data Levels
DAA	170	1	180	Dual Pol Digital Accumulation Array 256 Data Levels
STA	171	1	180	Dual Pol Storm Total Accumulation 16 Data Levels
DSA	172	1	180	Dual Pol Digital Storm Total Accumulation 256 Data Levels
DUA	173	1	180	Dual Pol Digital User Selectable Accumulation Product
DOD	174	1	180	Dual Pol Digital One-Hour Difference Accum 256 Data Levels
DSD	175	1	180	Dual Pol Digital Storm Total Difference Accum 256 Data Levels
DPR	176	1	180	Digital Precipitation Rate Data: 65536 level/ 0.13 mm
HHC	177	1	180	Hybrid Hydrometeor Classification Data Array Product: 256 level/

Figure 10. RPG Build 12.0 current generation table with the new Dual Pol QPE products.

The 4bit Dual Pol QPE rainfall products have editable data levels, just like their legacy PPS counterparts. For example, there is a QPE storm total product, called the Storm Total Accumulation (STA). The STA (Dual Pol) and the STP (PPS) data levels are **both** edited to the same values (Figure 11).

### Edit Selectable Product Parameters

Cell Product: OHP/THP, OHA Data Levels

Category: STP, STA Data Levels; VAD and RCM Heights

Velocity Data Levels

STP, STA Data Levels

-----INSTRUCTIONS-----  
Permissible value range is from 0.0 to 25.4 inches in multiples of 0.1. The value entered represents the minimum value of the data level.

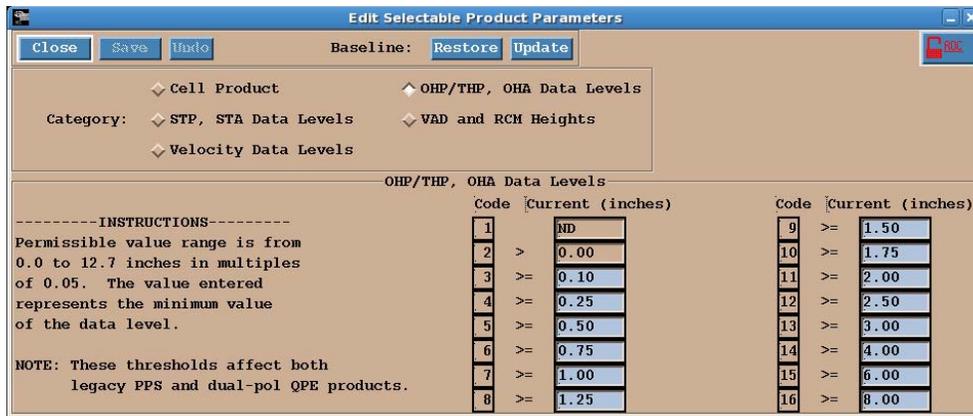
NOTE: These thresholds affect both legacy PPS and dual-pol QPE products.

Code	Current (inches)	Code	Current (inches)
1	ND	9	>= 3.0
2	>	10	>= 4.0
3	>= 0.3	11	>= 5.0
4	>= 0.6	12	>= 6.0
5	>= 1.0	13	>= 8.0
6	>= 1.5	14	>= 10.0
7	>= 2.0	15	>= 12.0
8	>= 2.5	16	>= 15.0

Figure 11. Edit Selectable Product Parameters window for the Storm Total Precipitation, STP (legacy PPS) and Storm Total Accumulation, STA (Dual Pol QPE) products.

Similarly, the data levels for the one hour and three hour products are editable. The Dual Pol QPE generates a one hour product, called the One Hour Accumulation (OHA). The OHA (Dual Pol), the OHP (PPS), and THP (PPS) data levels are **all** edited to the same values (Figure 12).

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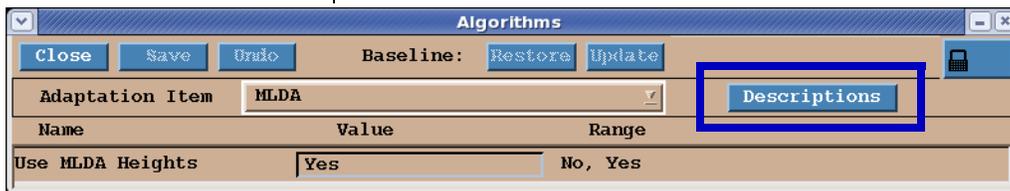
**Figure 12.** Edit Selectable Product Parameters window for the One Hour Precipitation (OHP), Three Hour Precipitation (THP) and the One Hour Accumulation (OHA) products.

It is important to be aware that the data level settings for both Figure 11 and Figure 12 apply **only** to the 4bit products.

## Algorithms Window

### Descriptions

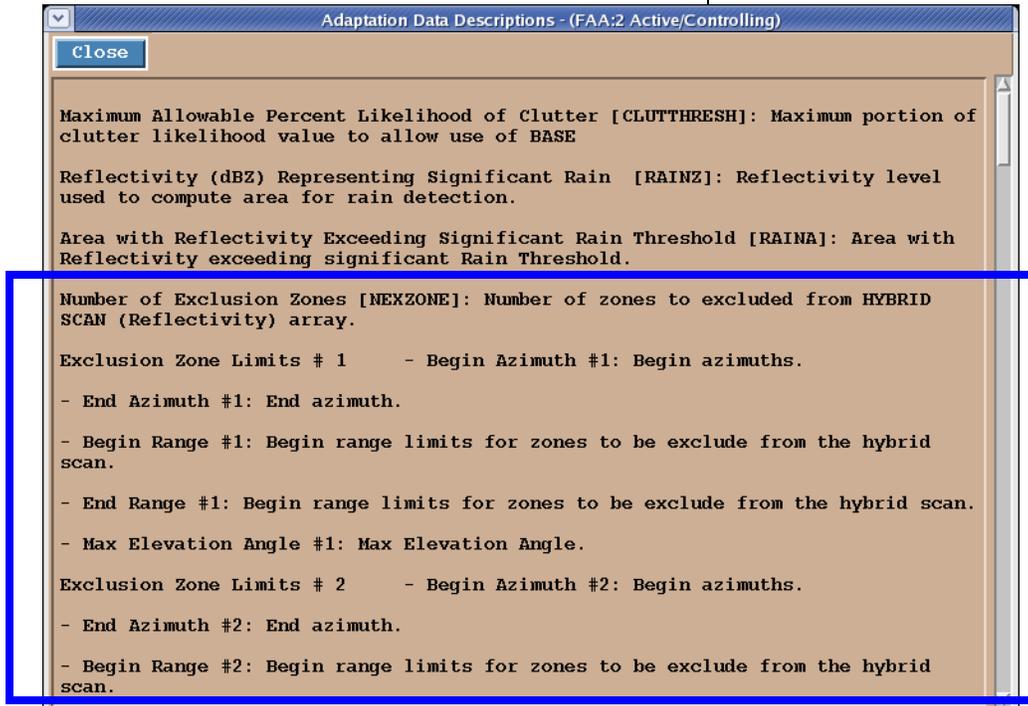
There is one change to the Algorithms window that applies to all the RPG algorithm parameters, whether they be from legacy or Dual Pol. There is a “Descriptions” button at the top of the window (Figure 13). Depending on the algorithm selected, the Descriptions button reveals a list of the editable parameters and a brief description of their function.



**Figure 13.** Descriptions button on Algorithms window.

An example of the use of the Descriptions window could be for defining exclusion zones for the legacy PPS “Hydromet Preprocessing” algorithm, which are an important, but infrequent, task. An exclusion zone is a volume, and there are several parameters required to define one. A start and

stop azimuth, a start and stop range, and a maximum elevation angle are all required. The total number of zones is also required. The Descriptions window for the Hydromet Preprocessing algorithm provides reminders of each of these parameters when defining exclusion zones (Figure 14).



**Figure 14.** Descriptions for Hydromet Preprocessing parameters, including those needed for Exclusion Zones.

Exclusion zones can also be defined independently for the Dual Pol QPE. It is recommended that the same exclusion zones be defined for both the PPS and QPE initially.

Whether for the PPS or the QPE, exclusion zones prevent reflectivity values from regions of known residual clutter from being converted to rain rate. Exclusion zones are often used for areas of wind farm contamination, which cannot be filtered as ground clutter. This does **not** remove wind farm contamination from the radar **base** data. An exclu-

*Exclusion Zones, the PPS, the QPE and You*

sion zone **only** prevents wind farm contamination from being processed into a rainfall estimate.

Archive II The Dual Pol upgrade at the RDA will result in an updated Level II data stream. The Archive II parameters window reflects the different types of level II data distribution, which vary depending on available bandwidth. For any given RPG, it is not expected that the value of this parameter would change, unless directed by someone at the ROC.

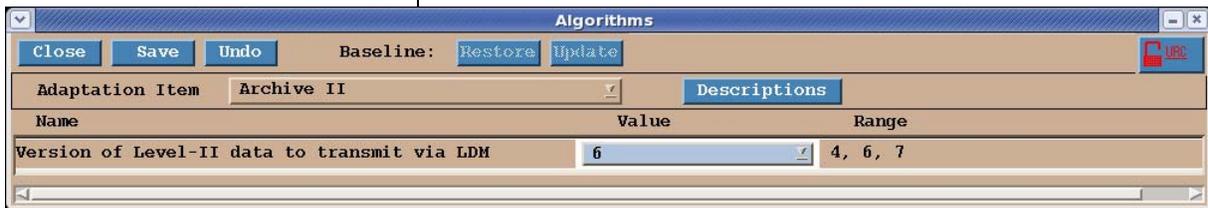


Figure 15. Archive II parameters window.

The default value for NWS RPGs and DoD RPGs that will be upgraded to NOAA Net this fall is 6. Level 6 is described as “full resolution”, which allows for both the Dual Pol and Super Res base data.

The default value for the remaining RPGs is 7, which refers to recombined base data. There is not yet sufficient bandwidth to distribute full resolution base data from these RPGs.

There will be additional information on this topic with the RPG Build 12.1 training .

New Dual Pol Algorithms

The Algorithms window at the RPG allows for parameter adjustments to many different algorithms. Some of these algorithms have been in place for many years, while others are new.

RPG Build 12.0 has new algorithms related to Dual Pol. Only **two** of them have adaptable

parameters that are Unit Radar Committee (URC) editable (Figure 16). These new algorithms and their parameters are viewable, even though they will not become active until your RPG is connected to a Build 12.0 (Dual Pol) RDA. The two new Dual Pol algorithms at this window are:

- Dual-Pol Precip, and
- MLDA.

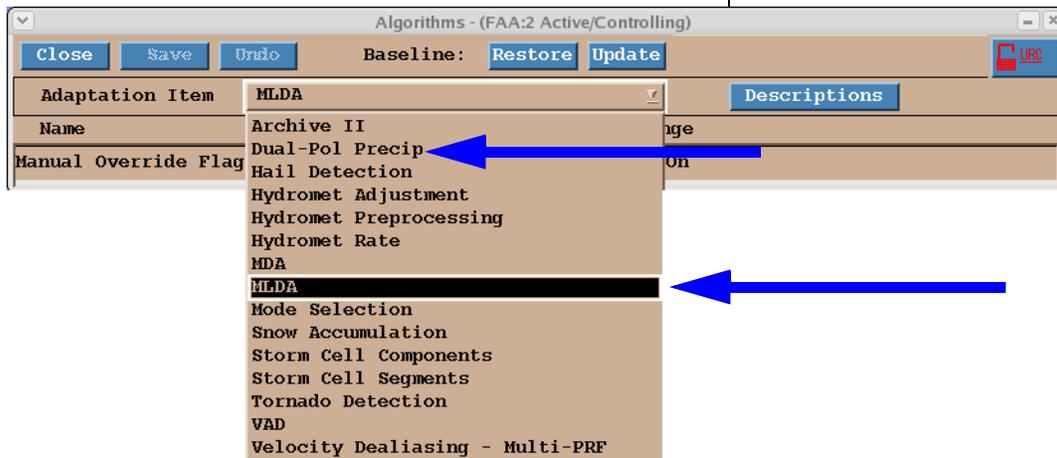


Figure 16. Algorithm dropdown with two new Dual Pol algorithms: Dual-Pol Precip and MLDA.

The QPE algorithm can be thought of as the “Dual Pol version” of the legacy PPS. There are some similarities between the Dual Pol QPE and the legacy PPS, but also significant differences. The QPE parameters under URC control are listed on the Algorithms window under “Dual-Pol Precip” (Figure 17). These parameters have legacy PPS counterparts, which will be described in more detail in the Dual Pol Operations Course.

*Dual-Pol Precip*

As part of the Dual Pol upgrade, the Melting Layer Detection Algorithm (MLDA) does what the name implies. Dual Pol radars can discriminate different precipitation types, which can be used to identify the melting level. The MLDA produces an overlay

*MLDA*

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Algorithms - (FAA:2 Active/Controlling)		
Close Save Undo Baseline: Restore Update		
Adaptation Item	Dual-Pol Precip	Descriptions
Name	Value	Range
Maximum Reflectivity	53.0	45.0 <= x <= 60.0, dBZ
PAIF Area Threshold	80	0 <= x <= 82800, km^2
PAIF Rate Threshold	0.5	0.0 <= x <= 50.0, mm/hr
Number of Exclusion Zones	0	0 <= x <= 20
Exclusion Zone Limits # 1 - Begin Azimuth #1	0.0	0.0 <= x <= 360.0, degrees
- End Azimuth #1	0.0	0.0 <= x <= 360.0, degrees
- Begin Range #1	0	0 <= x <= 124, mm
- End Range #1	0	0 <= x <= 124, mm
- Elevation angle #1	0.0	0.0 <= x <= 19.5, degrees
Exclusion Zone Limits # 2 - Begin Azimuth #2	0.0	0.0 <= x <= 360.0, degrees
- End Azimuth #2	0.0	0.0 <= x <= 360.0, degrees
- Begin Range #2	0	0 <= x <= 124, mm
- End Range #2	0	0 <= x <= 124, mm
- Elevation angle #2	0.0	0.0 <= x <= 19.5, degrees
Exclusion Zone Limits # 3 - Begin Azimuth #3	0.0	0.0 <= x <= 360.0, degrees
- End Azimuth #3	0.0	0.0 <= x <= 360.0, degrees
- Begin Range #3	0	0 <= x <= 124, mm
- End Range #3	0	0 <= x <= 124, mm
- Elevation angle #3	0.0	0.0 <= x <= 19.5, degrees

Figure 17. Dual Pol Precip (QPE) algorithm parameters.

product with contours of the top and bottom of the melting layer.

Perhaps the most important function of the MLDA is the downstream algorithms that it supports. The Hydrometeor Classification Algorithm (HCA) uses the MLDA output to identify precipitation type bin-by-bin, as well as non-precipitation returns, such as biological scatterers. The HCA output is used as a stand alone product, but is also input to the QPE.

The MLDA parameter that can be edited under URC guidelines is the “Use MLDA Heights” (Figure 18). This parameter controls the output from the MLDA, which can be of two types. MLDA generated information includes the melting layer top and bottom heights. If there is a suspected problem

with the MLDA, the alternative is the 0° Celsius height from the RPG's Environmental Data.

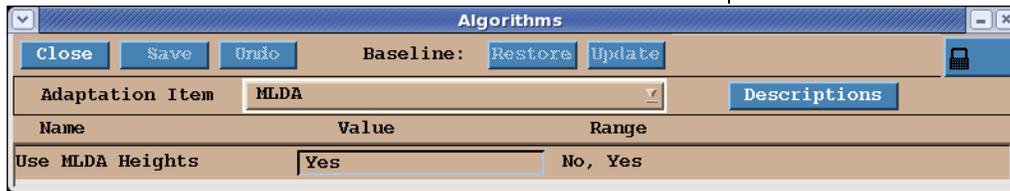


Figure 18. MLDA parameter.

The default value for “Use MLDA Heights” is “Yes”, which sends the MLDA generated height information on to the HCA. Setting this parameter to “No” uses the 0° Celsius height from the RPG's Environmental Data instead. The need to set this parameter to “No” is expected to be infrequent.

The Mesocyclone algorithm and the associated Mesocyclone (M) product have been available since the NEXRAD was originally deployed. In 2003, the Mesocyclone Rapid Update (MRU) product was introduced, which is an elevation by elevation output of the Mesocyclone algorithm detections.

The first phase of the deployment of the Mesocyclone Detection Algorithm (MDA) began in 2004. The MDA generates the end of volume Mesocyclone (MD) product, as well as an elevation by elevation Digital Mesocyclone Detection (DMD) data array. The MD and DMD products are available in graphical D2D format. The DMD output is also available through the SCAN suite of products.

## RPG Build 12.0 Changes Not Dual Pol Dependent

### Legacy Meso Algorithm and Products Removed

The MDA and its associated products have been determined as sufficient as a decision aid. Hence, the legacy Mesocyclone algorithm, the M product, and the MRU products are removed as of RPG Build 12.0.

If the legacy M product is still identified as an alert-paired predict for RPG based alerts, an alternate product will need to be selected.

### **MDA Ingests Super Res**

Super resolution (SR) products ( $0.5^\circ$  azimuth) are only available for the Split Cut elevations of all the VCPs. The processing at the RDA that makes SR data possible also increases the variance or error in the base data estimate. This results in data that are noisier in appearance and not necessarily suitable for the existing RPG algorithms.

The MDA and other RPG algorithms have thus far been ingesting base data processed by the Recombination algorithm for the Split Cut elevations. Recombined base data is SR data that is processed back to the legacy resolution,  $1^\circ$  azimuth and .25 km or 1 km in range.

With RPG Build 12.0, MDA will be ingesting SR data from the Split Cut elevations. Since SR velocity data are processed out to 300 km (162 nm), MDA also examines the data out to that range for the Split Cuts. The remaining RPG algorithms (e.g. PPS) will continue to use the Recombined base data from the Split Cuts.

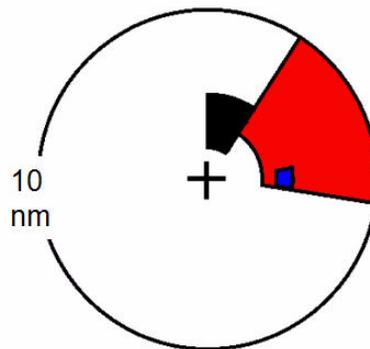
The performance of MDA with SR base data has been evaluated. The results were slightly more and slightly stronger detections with the ingest of SR base data. The software functioned properly

with all observed detections resulting from shear regions in the velocity base data.

Exclusion Zones are part of the PPS and will also be part of the QPE algorithm. Figure 19 demonstrates one way of defining exclusion zones to address wind turbine contamination at close range. Notice that Zone 3, which is closest to the radar, has the highest maximum elevation angle. Also, defining an azimuth from 360° to 35° seems like a reasonable thing to do. However, the resultant exclusion zone would look nothing like the small black wedge in Figure 19!

**Fix for PPS Exclusion Zones**

zone	Begin Azimuth	End Azimuth	Begin Range	End Range	Max Angle
1	35.0	117.0	3	10	1.0
2	75.0	105.0	4	5	2.0
3	360.0	35.0	2	5	3.0



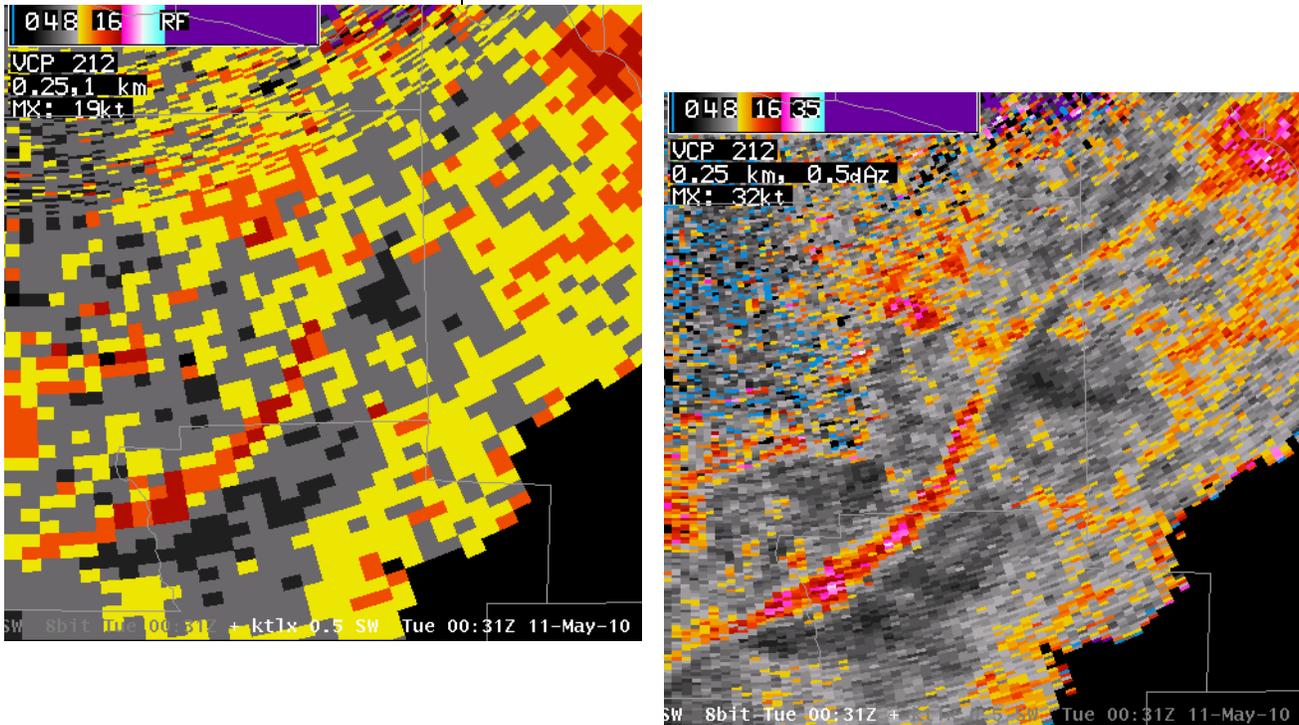
**Figure 19.** An example way of applying exclusion zones to exclude wind turbine contamination from being converted to rainfall, except that Zone 3 will not be as expected!.

A software error was found related to defining the azimuths for exclusion zones. If a start azimuth is 360°, the defined zone will sweep in the **counter-clockwise** direction! That means that Zone 3 would actually extend counterclockwise from 360° to 35°, capturing the sweep of azimuths **outside** of the intended ones. Fortunately, this error has been fixed with RPG Build 12.0, and 360° can be used as a start azimuth.

**Software Error with Defining Exclusion Zones**

## 8bit Spectrum Width All Elevations

Prior to RPG Build 12.0, 8bit Spectrum Width base products were generated only for the Split Cut elevations. With RPG Build 12.0, 8bit Spectrum Width base products are generated for all elevations. Figure 20 has both 3bit and 8bit Spectrum Width (SW) products for the same event, demonstrating the significant difference in detail. Since this example is from 0.5°, only the 8bit SW is processed as SR (0.5° azimuth).



**Figure 20.** 3bit Spectrum Width (left) and 8bit Spectrum Width (right). There is a significant difference in detail!

## Summary

RPG Build 12.0 will be deployed well ahead of the deployment of Dual Polarization (RDA Build 12.0). This training addresses the RPG HCI changes that will support Dual Pol, along with some changes that do not rely on Dual Pol to be activated. The document reflects the pre-deployment state of knowledge of the changes with RPG Build 12.0 that are operationally relevant.