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October 11, 2010

Ms. Betsy Ullrich  
Senior Health Physicist  
Commercial and R&D Branch  
Division of Nuclear Materials Safety  
Nuclear Regulatory Commission, Region 1  
475 Allendale Road  
King of Prussia, PA 19406-1415

Q-5

2010 OCT 12 PM 12: 28  
RECEIVED  
REGION 1

Re: NRC License No. 06-00221-08, Docket Number: 030-03759

Subject: Decommissioning of Bethany, Connecticut Site Only

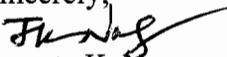
Dear Ms. Ullrich:

The results of the final soil sampling in support of the license termination of our Bethany, CT site show that only one sample in the peach tree area exceeded the DCGL. Our proposed remediation plan for this spot, which is in accordance with the commitments made in our communications dated June 15, 2010 and August 05, 2010, is enclosed.

During the site inspection on September 01, 2010, Mr. Thompson (NRC) was touring the greenhouses on the property and noticed that a floor drain had had the concrete seal removed from it. He suggested that a sample be collected from the drain for radiological analysis. The results of this sample were less than the DCGL value as shown in the report. This drain sample data will be reported with the final status survey results for the buildings at the Bethany site.

As I indicated earlier, Chemtura hired Radiation Safety Associates (RSA), Inc. as a consultant for this project. If you have any further questions or issues concerning the additional information/responses, you may directly contact Mr. K. Paul Steinmeyer, RSA (Tel: 860-228-0487 and E-mail: kpstein@radpro.com). With the onset of cold weather, we are requesting your prompt action on reviewing this additional corrective action so the additional remediation can be accomplished before the ground freezes.

Sincerely,

  
Jayanta K. Nag  
Radiation Safety Officer

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## **Chemtura Bethany Site**

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- Final Status Survey Results
  - Proposed Additional Remediation
  - Proposed Re-sampling Plan
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**Radiation Safety Associates, Inc.**

**October 11, 2010**

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## **EXECUTIVE SUMMARY**

Soil sample results from the MARSSIM-compliant license termination survey indicated that only one point in the Peach Tree area was contaminated in excess of the established limits. Chemtura is proposing to remove 8 ft<sup>3</sup> of soil from the area around this sample and resample the entire Peach Tree area. Contaminated soil will be disposed of through a licensed radioactive waste broker.

## **INTRODUCTION**

This is a report on the results of the soil sampling that was done as part of the Chemtura Bethany Site remediation, and was the subject of a sampling plan and responses to questions dated June 15, 2010 and August 05, 2010 respectively. The analyses of the soil samples indicate that the Apple Tree Area, Grape Area and Corral Area each meet the unconditional free-release criterion. One of the 36 samples in the Peach Tree Area, however, exceeded the criterion. Chemtura proposes to remediate a volume of soil around this single sample location, re-sample the entire Peach Tree area using the MARSSIM method (i.e., 18 random samples), and obtain two samples from the excavated area in addition to the 18 random samples.

## **PURPOSE**

The purpose of this document is three fold.

1. Report the results of final status soil sampling of the four outdoor areas that were utilized for experiments involving C-14 compounds;
2. Describe the additional remediation activities necessitated by one sample result;
3. Submit a supplemental sampling plan for regulatory approval that will represent the final radiological status of the Peach Tree area.

Once all soil concentrations are within the regulatory guideline values, Chemtura will petition NRC to confirm that its site in Bethany, Connecticut, meets the criterion for unrestricted radiological release and remove this site from the license.

## **INFORMATION PREVIOUSLY PROVIDED**

The Facility Description, Data Quality Objectives and Acceptance Criteria are the same as were reported in the June 15, 2010 and August 5, 2010 documents referred to above.

## **FINDINGS—SAMPLE RESULTS**

Soil samples were collected on September 14 and 15, 2010. Steven R. Courtemanche, Health Physicist, NRC, was present during sample collection. Samples were analyzed by Eberline Analytical for carbon-14 (C-14) using modified EPA Method 520.0.

**1. Corral Area**

As shown in the survey plan dated June 15, 2010, 18 sample points were randomly selected. At each location a sample was obtained at 0-6 inches and at 6-12 inches. All sample results were less than the acceptance criterion. Sample results are provided in the table below.

Location	Result pCi/g	MDA pCi/g
FSC-1, 0-6 in, Corral Area	1.82E-01	6.91E-01
FSC-2, 0-6 in, Corral Area	1.93E-01	7.35E-01
FSC-3, 0-6 in, Corral Area	-1.90E-01	7.23E-01
FSC-4, 0-6 in, Corral Area	-1.98E-01	7.53E-01
FSC-5, 0-6 in, Corral Area	-1.93E-01	7.34E-01
FSC-6, 0-6 in, Corral Area	3.63E-01	6.90E-01
FSC-7, 0-6 in, Corral Area	3.85E-01	7.32E-01
FSC-8, 0-6 in, Corral Area	-1.92E-01	7.30E-01
FSC-9, 0-6 in, Corral Area	1.85E-01	7.01E-01
FSC-10, 0-6 in, Corral Area	0.00E+00	7.26E-01
FSC-11, 0-6 in, Corral Area	0.00E+00	7.12E-01
FSC-12, 0-6 in, Corral Area	7.61E-01	7.23E-01
FSC-13, 0-6 in, Corral Area	3.86E-01	7.33E-01
FSC-14, 0-6 in, Corral Area	1.84E-01	6.98E-01
FSC-15, 0-6 in, Corral Area	0.00E+00	7.44E-01
FSC-16, 0-6 in, Corral Area	1.90E-01	7.21E-01
FSC-17, 0-6 in, Corral Area	4.01E-01	7.62E-01
FSC-17, 0-6 in, Corral Area (DUP)	6.04E-01	7.65E-01
FSC-18, 0-6 in, Corral Area	2.00E-01	7.60E-01
FSC-1, 6-12 in, Corral Area	-1.95E-01	7.42E-01
FSC-2, 6-12 in, Corral Area	0.00E+00	7.82E-01
FSC-3, 6-12 in, Corral Area	1.98E-01	7.53E-01
FSC-4, 6-12 in, Corral Area	0.00E+00	7.51E-01
FSC-5, 6-12 in, Corral Area	0.00E+00	8.05E-01
FSC-6, 6-12 in, Corral Area	0.00E+00	8.07E-01
FSC-7, 6-12 in, Corral Area	-1.87E-01	7.11E-01
FSC-8, 6-12 in, Corral Area	2.03E-01	7.73E-01
FSC-9, 6-12 in, Corral Area	0.00E+00	7.17E-01
FSC-10, 6-12 in, Corral Area	-2.06E-01	7.82E-01
FSC-11, 6-12 in, Corral Area	-3.96E-01	7.52E-01
FSC-12, 6-12 in, Corral Area	0.00E+00	7.51E-01
FSC-13, 6-12 in, Corral Area	1.98E-01	7.53E-01
FSC-14, 6-12 in, Corral Area	0.00E+00	7.56E-01
FSC-15, 6-12 in, Corral Area	1.99E-01	7.57E-01
FSC-16, 6-12 in, Corral Area	7.91E-01	4.36E-01
FSC-16, 6-12 in, Corral Area (DUP)	9.72E-01	7.00E-01
FSC-17, 6-12 in, Corral Area	-1.93E-01	3.97E-01
FSC-18, 6-12 in, Corral Area	1.96E-01	4.16E-01

DUP = Duplicate sample.

## 2. Peach Tree Area

As shown in the survey plan dated June 15, 2010, 18 sample points were randomly selected. At each location a sample was obtained at 0-6 inches and at 6-12 inches. One sample result exceeded the acceptance criterion. Chemtura's proposal to remediate this location is provided later in this report. Sample results are provided in the table below.

Location	Result pCi/g	MDA pCi/g
FSP-1, 0-6 in, Peach Tree Area	5.59E-01	6.71E-01
FSP-2, 0-6 in, Peach Tree Area	1.36E+00	7.01E-01
FSP-3, 0-6 in, Peach Tree Area	5.88E-01	7.06E-01
FSP-4, 0-6 in, Peach Tree Area	7.86E-01	7.08E-01
FSP-5, 0-6 in, Peach Tree Area	9.87E-01	7.10E-01
FSP-6, 0-6 in, Peach Tree Area	9.92E-01	7.15E-01
FSP-7, 0-6 in, Peach Tree Area	1.20E+00	7.23E-01
FSP-8, 0-6 in, Peach Tree Area	2.72E+00	7.00E-01
FSP-9, 0-6 in, Peach Tree Area	4.96E+00	7.45E-01
FSP-10, 0-6 in, Peach Tree Area	3.45E+00	7.31E-01
FSP-11, 0-6 in, Peach Tree Area	5.18E+00	7.17E-01
FSP-12, 0-6 in, Peach Tree Area	1.79E+00	7.18E-01
FSP-13, 0-6 in, Peach Tree Area	1.01E+00	7.30E-01
FSP-14, 0-6 in, Peach Tree Area	2.37E+00	7.49E-01
FSP-14, 0-6 in, Peach Tree Area (DUP)	2.15E+00	7.44E-01
FSP-15, 0-6 in, Peach Tree Area	1.20E+00	7.58E-01
FSP-16, 0-6 in, Peach Tree Area	8.11E-01	7.71E-01
FSP-17, 0-6 in, Peach Tree Area	6.09E-01	7.71E-01
FSP-18, 0-6 in, Peach Tree Area	1.91E-01	7.27E-01
FSP-1, 6-12 in, Peach Tree Area	2.01E-01	7.63E-01
FSP-2, 6-12 in, Peach Tree Area	5.86E-01	7.42E-01
FSP-3, 6-12 in, Peach Tree Area	-2.14E-01	8.13E-01
FSP-4, 6-12 in, Peach Tree Area	0.00E+00	7.61E-01
FSP-5, 6-12 in, Peach Tree Area	2.03E-01	7.70E-01
FSP-6, 6-12 in, Peach Tree Area	4.03E-01	7.67E-01
FSP-7, 6-12 in, Peach Tree Area	5.83E-01	7.38E-01
FSP-8, 6-12 in, Peach Tree Area	1.46E+00	7.93E-01
FSP-9, 6-12 in, Peach Tree Area	3.95E+00	7.51E-01
FSP-10, 6-12 in, Peach Tree Area	2.59E+00	7.56E-01
<b>FSP-11, 6-12 in, Peach Tree Area</b>	<b>2.39E+02</b>	<b>6.75E-01</b>
FSP-12, 6-12 in, Peach Tree Area	4.08E+00	7.76E-01
FSP-13, 6-12 in, Peach Tree Area	5.74E-01	7.28E-01
FSP-13, 6-12 in, Peach Tree Area (DUP)	8.49E-01	8.07E-01
FSP-14, 6-12 in, Peach Tree Area	7.89E-01	7.50E-01
FSP-15, 6-12 in, Peach Tree Area	7.65E-01	7.27E-01
FSP-16, 6-12 in, Peach Tree Area	1.97E-01	7.48E-01
FSP-17, 6-12 in, Peach Tree Area	4.08E-01	7.76E-01
FSP-18, 6-12 in, Peach Tree Area	1.95E-01	7.43E-01

DUP = Duplicate sample.

### 3. Apple Tree Area

As shown in the survey plan dated June 15, 2010, 18 sample points were randomly selected. At each location a sample was obtained at 0-6 inches and at 6-12 inches. All sample results were less than the acceptance criterion. Sample results are provided in the table below.

Location	Result pCi/g	MDA pCi/g
FSA-1, 0-6 in, Apple Tree Area	3.94E-01	7.48E-01
FSA-2, 0-6 in, Apple Tree Area	0.00E+00	7.61E-01
FSA-3, 0-6 in, Apple Tree Area	4.02E-01	7.65E-01
FSA-4, 0-6 in, Apple Tree Area	0.00E+00	7.41E-01
FSA-5, 0-6 in, Apple Tree Area	1.96E-01	7.44E-01
FSA-6, 0-6 in, Apple Tree Area	0.00E+00	7.20E-01
FSA-7, 0-6 in, Apple Tree Area	0.00E+00	7.29E-01
FSA-8, 0-6 in, Apple Tree Area	1.96E-01	7.44E-01
FSA-9, 0-6 in, Apple Tree Area	5.92E-01	7.51E-01
FSA-10, 0-6 in, Apple Tree Area	0.00E+00	7.71E-01
FSA-11, 0-6 in, Apple Tree Area	0.00E+00	7.26E-01
FSA-11, 0-6 in, Apple Tree Area (DUP)	1.80E-01	7.17E-01
FSA-12, 0-6 in, Apple Tree Area	1.84E-01	7.33E-01
FSA-13, 0-6 in, Apple Tree Area	0.00E+00	6.97E-01
FSA-14, 0-6 in, Apple Tree Area	-1.79E-01	7.15E-01
FSA-15, 0-6 in, Apple Tree Area	0.00E+00	7.03E-01
FSA-16, 0-6 in, Apple Tree Area	1.86E-01	7.41E-01
FSA-17, 0-6 in, Apple Tree Area	4.08E-01	8.13E-01
FSA-18, 0-6 in, Apple Tree Area	1.86E-01	7.38E-01
FSA-1, 6-12 in, Apple Tree Area	0.00E+00	7.61E-01
FSA-2, 6-12 in, Apple Tree Area	-3.59E-01	7.15E-01
FSA-3, 6-12 in, Apple Tree Area	0.00E+00	7.21E-01
FSA-4, 6-12 in, Apple Tree Area	0.00E+00	7.26E-01
FSA-5, 6-12 in, Apple Tree Area	1.80E-01	7.20E-01
FSA-6, 6-12 in, Apple Tree Area	1.82E-01	7.27E-01
FSA-7, 6-12 in, Apple Tree Area	1.83E-01	7.29E-01
FSA-8, 6-12 in, Apple Tree Area	0.00E+00	7.30E-01
FSA-9, 6-12 in, Apple Tree Area	-1.84E-01	7.34E-01
FSA-10, 6-12 in, Apple Tree Area	3.89E-01	7.58E-01
FSA-10, 6-12 in, Apple Tree Area (DUP)	-1.96E-01	7.63E-01
FSA-11, 6-12 in, Apple Tree Area	-1.99E-01	7.76E-01
FSA-12, 6-12 in, Apple Tree Area	-4.00E-01	7.79E-01
FSA-13, 6-12 in, Apple Tree Area	-2.09E-01	8.15E-01
FSA-14, 6-12 in, Apple Tree Area	-4.35E-01	8.48E-01
FSA-15, 6-12 in, Apple Tree Area	-1.91E-01	7.46E-01
FSA-16, 6-12 in, Apple Tree Area	-1.92E-01	7.49E-01
FSA-17, 6-12 in, Apple Tree Area	0.00E+00	7.50E-01
FSA-18, 6-12 in, Apple Tree Area	-1.92E-01	7.49E-01

DUP = Duplicate sample.

#### 4. Grape Area

As shown in the survey plan dated June 15, 2010, 18 sample points were randomly selected. At each location a sample was obtained at 0-6 inches and at 6-12 inches. All sample results were less than the acceptance criterion. Sample results are provided in the table below.

Location	Result pCi/g	MDA pCi/g
FSG-1, 0-6 in, Grape Vine Area	-1.94E-01	7.57E-01
FSG-2, 0-6' , in Grape Vine Area	-1.96E-01	7.64E-01
FSG-3, 0-6 in, Grape Vine Area	0.00E+00	7.83E-01
FSG-4, 0-6 in, Grape Vine Area	0.00E+00	7.74E-01
FSG-5, 0-6 in, Grape Vine Area	1.95E-01	7.61E-01
FSG-6, 0-6 in, Grape Vine Area	-3.96E-01	7.71E-01
FSG-7, 0-6 in, Grape Vine Area	-1.99E-01	7.74E-01
FSG-8, 0-6 in, Grape Vine Area	-1.91E-01	7.43E-01
FSG-8, 0-6 in, Grape Vine Area (DUP)	-1.89E-01	7.37E-01
FSG-9, 0-6 in, Grape Vine Area	0.00E+00	7.01E-01
FSG-10, 0-6 in, Grape Vine Area	0.00E+00	7.23E-01
FSG-11, 0-6 in, Grape Vine Area	0.00E+00	7.32E-01
FSG-12, 0-6 in, Grape Vine Area	-3.75E-01	7.30E-01
FSG-13, 0-6 in, Grape Vine Area	0.00E+00	7.25E-01
FSG-14, 0-6 in, Grape Vine Area	-3.58E-01	6.97E-01
FSG-15, 0-6 in, Grape Vine Area	1.87E-01	7.29E-01
FSG-16, 0-6 in, Grape Vine Area	-1.86E-01	7.23E-01
FSG-17, 0-6 in, Grape Vine Area	0.00E+00	7.21E-01
FSG-18, 0-6 in, Grape Vine Area	0.00E+00	7.38E-01
FSG-1, 6-12 in, Grape Vine Area	1.86E-01	7.26E-01
FSG-2, 6-12 in, Grape Vine Area	-1.87E-01	7.28E-01
FSG-3, 6-12 in, Grape Vine Area	1.87E-01	7.28E-01
FSG-4, 6-12 in, Grape Vine Area	-3.77E-01	7.34E-01
FSG-5, 6-12 in, Grape Vine Area	0.00E+00	7.32E-01
FSG-6, 6-12 in, Grape Vine Area	-1.90E-01	7.41E-01
FSG-7, 6-12 in, Grape Vine Area	0.00E+00	7.37E-01
FSG-7, 6-12 in, Grape Vine Area (DUP)	4.14E-01	7.86E-01
FSG-8, 6-12 in, Grape Vine Area	0.00E+00	7.42E-01
FSG-9, 6-12 in, Grape Vine Area	1.99E-01	7.56E-01
FSG-10, 6-12 in, Grape Vine Area	1.95E-01	7.42E-01
FSG-11, 6-12 in, Grape Vine Area	1.98E-01	7.53E-01
FSG-12, 6-12 in, Grape Vine Area	3.98E-01	7.56E-01
FSG-13, 6-12 in, Grape Vine Area	0.00E+00	7.60E-01
FSG-14, 6-12 in, Grape Vine Area	3.98E-01	7.56E-01
FSG-15, 6-12 in, Grape Vine Area	2.01E-01	7.62E-01
FSG-16, 6-12 in, Grape Vine Area	2.00E-01	7.61E-01
FSG-17, 6-12 in, Grape Vine Area	2.02E-01	7.66E-01
FSG-18, 6-12 in, Grape Vine Area	2.02E-01	7.67E-01

DUP = Duplicate sample.

## PROPOSED ADDITIONAL REMEDIATION OF PEACH TREE AREA

In the letter to Betsy Ulrich, NRC Region I, dated August 5, 2010, Chemtura committed to remediate any spots found contaminated, then re-sample the entire plot. Specifically in this case, Chemtura proposes to excavate an area 2 feet by 2 feet around sample FSP-11 (depth of 6-12 inches), in the Peach Tree Area to a depth of 2 feet (total soil volume = 8 ft<sup>3</sup>). A new sample starting point will then be established, and a new random 18-sample pattern will be generated. A soil samples will be taken from each of these locations at a depth of 0-6 inches. This random pattern is illustrated in Attachment A to this report.

In addition the 18 random samples, Chemtura proposes to take two soil samples from the bottom of the new 2'x2'x2' excavation, at a depth of 0-6 inches from the bottom of the hole. Due to the previous excavation (approximately 18") and the new excavation proposed here (24"), the depth of these two samples will actually be 42" to 48" below grade.

Chemtura wants to remind NRC that there are currently 52 data points from this area that were obtained after the initial major remediation was performed. One of these is located only 18 inches from FSP-11 (06"-12"), and only this one has exceeded the DCGL. This is strong evidence that the current sample FSP-11 (6"-12") is an anomalous outlier. Locations of these previous sample points are also included on Attachment A.

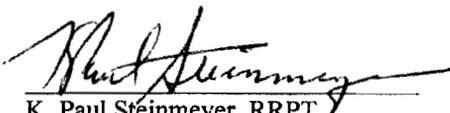
### Waste Disposal

The approximately 8 ft<sup>3</sup> of potentially contaminated soil proposed to be removed from the Peach Tree area as part of this remediation will be placed in DOT-approved shipping containers and turned over to a licensed waste broker.

### Additional Sample

During the site inspection on September 1, 2010, Mr. Thomas K. Thompson, Senior Health Physicist, NRC, was touring the greenhouses on the property and noticed that a floor drain had had the concrete seal removed from it. He suggested that a sample be collected from the drain for radiological analysis. The results of this sample were less than the DCGL value as shown in the table below. This drain sample data will also be reported with the final status survey results for the buildings at the Bethany site.

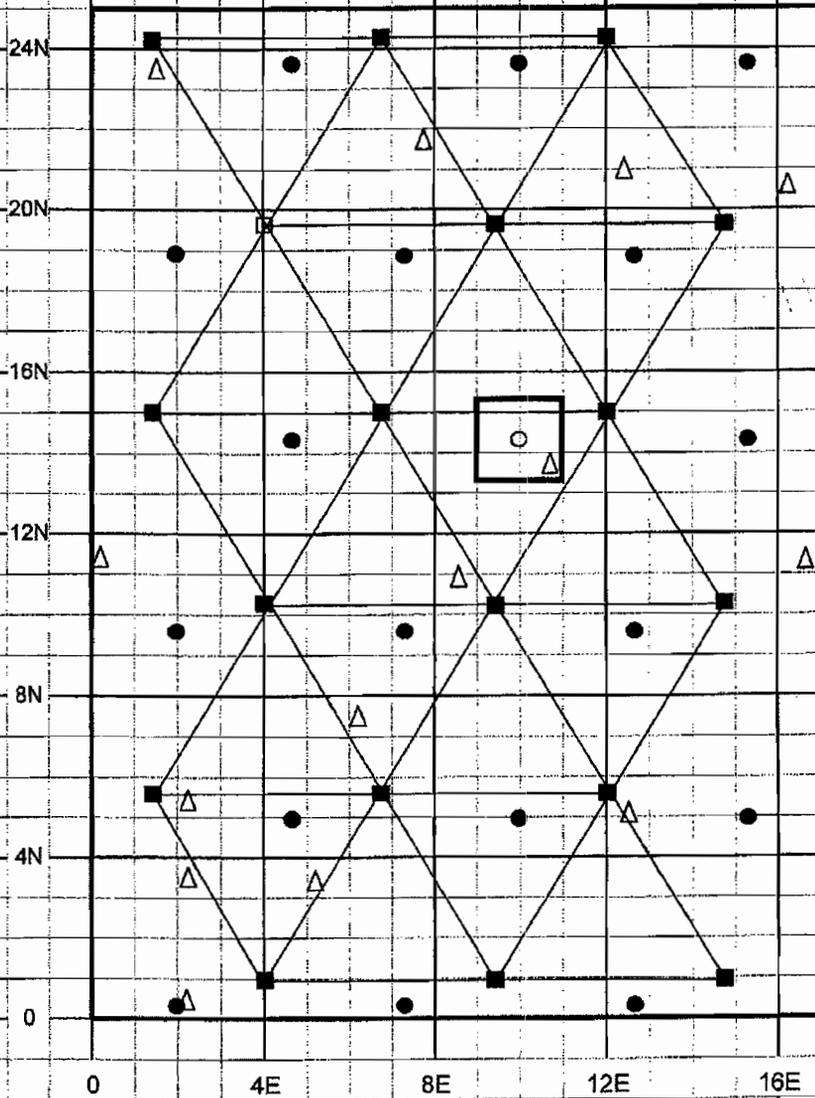
Location	Result pCi/g	MDA pCi/g
Drain Sample (Back Section) Greenhouse #3	1.86E+00	6.74E-02
Drain Sample (Back Section) Greenhouse #3	2.22E+00	6.99E-02

  
K. Paul Steinmeyer, RRPT  
Senior Health Physicist

Oct. 11, 2010  
Date

**PEACH TREE 2**

- △ Post Decon Scoping Survey Sample point
- Final Status Survey #1 Sample Point
- Post Decon 2 Final Status # 2 Sample Point



	E	N
1	4' 1"	0' 11"
2	9' 5"	0' 11"
3	14' 9"	0' 11"
4	1' 5"	5' 7"
5	6' 9"	5' 7"
6	12' 1"	5' 7"
7	4' 1"	10' 3"
8	9' 5"	10' 3"
9	14' 9"	10' 3"
10	1' 5"	14' 11"
11	6' 9"	14' 11"
12	12' 1"	14' 11"
RS 13	4' 1"	19' 7"
14	9' 5"	19' 7"
15	14' 9"	19' 7"
16	1' 5"	24' 3"
17	6' 9"	24' 3"
18	12' 1"	24' 3"