Activation of turf growth with foliar feed nutrient solution.

The procedure for this cleanup starts with insuring that irrigation is provided for complete coverage of the grass infield and turf along the base paths. With complete irrigation coverage provided the next step involves the growth activation of turf and weeds with a high level of foliar applied nutrients. The nutrients were applied (on 08/13/10) with a gasoline powered hydromulch applicator with a 50 gallon tank. The nutrient sprays were applied in two batches of 50 gallons and each batch was applied to .4 acres of turf that included the infield (82 ft. X 85 ft.) and the turf areas along the 1st and 3rd base lines (160 ft X 27 ft. X 2-both sides) extending to the back of the infield arc. Appling 50 gallons to .4 acres amounts to 125 gallon/a, applied 2 times the total gallons per acre is 250 GPA. The liquid fertilizer blend that contained potassium nitrate, calcium nitrate and iron/micro nutrient blend was applied on 08/13/10.

The nutrients used for pre spray activation were:

**Yara Brand Potassium Nitrate Crystaline 13.7-46.3-0** in a 50 lb bag.
The recommended amount is 50 lb/a. To obtain this rate add 10 pounds to 50 gallons and apply twice to .4 acres for a total rate of 50 lb/a. However this time (08/13/10) 20 pounds were added to 50 gallons and applied twice to .4 acres for a total rate of 100 lb/a doubling of the recommended rate. The actual rate of N is 13.7 lb/a.

**Yara Brand Calcium nitrate 15.5-0-0** in a 50 lb bag.
The recommended amount is 200 lb/a of this formulation. To obtain this rate add 40 pounds to 50 gallons and apply twice to .4 acres for a total rate of 200 lb/a. The actual rate of N is 31.0 lb/a.

**Feature 6-0-0, with 10% Fe, 2.5% Mn, 1% Mg and 8% S** in 3.0 lb bag.
The recommended amount is 6.0 lb/a. To obtain this rate add 1.2 lb to 50 gallons and apply twice to .4 acres for a total rate of 6.0 lb/a. The actual rate of N applied is .36 lb/a.
Herbicide application following turf activation with foliar feed nutrients.

Table 01, description and timing for Aiea baseball field clean up protocols.

<table>
<thead>
<tr>
<th>Description</th>
<th>Date</th>
<th>Day of year</th>
<th>Days after previous activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foliar feed, turf growth activation</td>
<td>08/13/10</td>
<td>225</td>
<td>0</td>
</tr>
<tr>
<td>01-herbicide spray (Barricade/Celsius/Revolver)</td>
<td>09/01/10</td>
<td>244</td>
<td>19</td>
</tr>
<tr>
<td>Thatch breakup, also apply dry KNO₃</td>
<td>09/23/11</td>
<td>266</td>
<td>22</td>
</tr>
<tr>
<td>02-herbicide spray (Sencor)</td>
<td>10/14/10</td>
<td>287</td>
<td>21</td>
</tr>
<tr>
<td>03-herbicide spray (Celsius/Monument)</td>
<td>11/10/10</td>
<td>314</td>
<td>27</td>
</tr>
<tr>
<td>Foliar feed CA&amp;K-nitrate, w/Fe</td>
<td>11/24/10</td>
<td>328</td>
<td>14</td>
</tr>
<tr>
<td>04-herbicide spray (Sencor)</td>
<td>12/08/10</td>
<td>342</td>
<td>14</td>
</tr>
<tr>
<td>05-herbicide spray (Celsius/Monument)</td>
<td>12/29/10</td>
<td>363</td>
<td>21</td>
</tr>
<tr>
<td>2010 year ends</td>
<td>12/31/10</td>
<td>365</td>
<td>3</td>
</tr>
<tr>
<td>Start close mowing with reels</td>
<td>01/21/11</td>
<td>21</td>
<td>24</td>
</tr>
<tr>
<td>Apply 15-0-15 w/1% Ronstar at 250 lb/a, infield only</td>
<td>02/02/11</td>
<td>35</td>
<td>14</td>
</tr>
<tr>
<td>Silica sand top-dress</td>
<td>02/09/11</td>
<td>39</td>
<td>18</td>
</tr>
<tr>
<td>06-herbicide spray (Revolver as spot treatment, use 2 oz/gal)</td>
<td>02/09/11</td>
<td>40</td>
<td>43 days after 05-herbicide spray</td>
</tr>
<tr>
<td>07-herbicide spray (Specticle/Revolver)</td>
<td>04/21/11</td>
<td>102</td>
<td>62 days after Rev. as spot trt.</td>
</tr>
</tbody>
</table>

01-Herbicide spray on 09/01/10.

1. Spray application is made using a hand held 5 nozzle boom fitted with TeeJet 8004LP nozzle tips. Spray powered with a gasoline Honda with Hypro roller pump. GPA is 40 with 13 PSI at handle. Tank volume is 26 gallons; applying at 40 GPA can cover .65 acres or 28,314 ft². Estimated area of infield and turf between base paths and dugouts home to 1st and 3rd base is .40 acres or 17,424 ft². Any extra spray will be applied to turf on the outfield side of the infield arc.

2. Herbicides applied will be:
   a. **Barricade**, recommended amount is .5 lb/a, amount added to 26 gallon tank is .3lb (136 g).
   b. **Celsius**, recommended amount is 4.9 dry oz/a, amount added to 26 gallon tank is 3.2 dry oz (91 g).
   c. **Revolver**, recommended amount is 26.2 oz/a, amount added to 26 gallons is 17.0 oz (775 ml).
   d. **MSO** (methylated seed oil), added to obtain 1% of finished spray, amount added to 26 gallons is 33.3 oz (945 ml).
Thatch breakup and fertilization on 09/23/10.

At this date a flexible drag harrow was pulled across the infield and baselines to breakup the thatch and isolate weedy grasses from the surrounding soil. A 150 pounds of potassium nitrate (13.7-46.3-0) was used on .4 acres of the infield and sidelines

02 herbicide spray on 10/14/10.

On this date Sencor 75DF will be applied with a .5% v/v MSO. A total of 26 gallons will be applied 2 times for an effective GPA of 80 gallons. Into each 26 gallon batch add 103 grams Sencor 75 DF and 500 ml MSO. Sencor rate is 2/3 lb/a with 80 GPA carrier volume.

03 herbicide spray on 11/10/10.

Observations made at 18 days after the Sencor indicated that goose grass appears to be completely control with large clumps rotting and matted to the soil due to heavy fall (early Nov-2010) rains. The second application of Celsius was made 27 days after the Sencor application. Using an 80 GPA will require 1.6 oz or 45.5 grams into 26 gallons and apply 2 times to the ball field. Also used 1% MSO or 33.3 oz or 945 ml per 26 gallons. For the Monument application we used two 5-gram packets in 26 gallons and applied only once to the entire infield and base lines. We should have used on 5 gram packets into a 26 gallon batch and made two applications but goofed again.

Foliar feed to maintain green color and maximum turf vigor on 11/24/10.

Foliar Feed occurred 14 days after Celsius/Monument spray application of 11/10/10. We used a 50 gallon hydromulch applicator and made two applications with application in opposite directions.

Yara Brand Potassium Nitrate (13.7-46.3-0.0) we need 20 pounds total, 10 pounds in 50 gallons and apply 2 times. On this date we applied 20 and 23.8 pounds in each batch, thus a doubling of intended rates.
Yara Brand Calcium nitrate (15.5-0-0) we need 80 pounds total, 40 pounds in 50 gallons and apply 2x's. On this date we did actually apply 40 lb in each batch
Feature 6-0-0, with 10% Fe, 2.5% Mn, 1% Mg and 8% S, we need 3 pounds total, 1.5 lb in 50 gallons apply 2 times. Ok, just right 1.5 lb in each batch and used up the entire 3 lb bag.

No dry prill 21%-N was applied.

Observations on 11/30/10:

On this date it is clear that the Dallas grass is drying up and appears to be controlled at 90-95%. The Love grass is not showing any necrosis just slight yellowing and reduced vigor. However, the Love grass was relatively easy to pull out by the roots. Goose grass is now regrowing from old stumps and not from seed germination. Looks like it’s time for another Sencor application.
04 herbicide application on 12/08/10.

On this date Sencor 75DF will be applied with a .5% v/v MSO. A total of 26 gallons will be applied 2 times for an effective GPA of 80 gallons. Into each 26 gallon batch add 103 grams Sencor 75 DF and 500 ml MSO. Sencor rate is 2/3 lb/a with 80 GPA carrier volume.

05 herbicide application on 12/29/10.

Herbicides applied:

a. **Celsius**, recommended amount is 4.9 dry oz/a, amount added to 26 gallon tank is 3.2 dry oz (91 g). For a double application, into 26 gallons add 46 grams and apply 2 times.

b. **MSO (methylated seed oil)**, added to obtain 1% of finished spray, amount added to 26 gallons is 33.3 oz (945 ml).

c. **Monument**, add 1 5-gram packets in 26 gallons and apply 2 times.

Apply Anderson’s 15-0-15 with 1% Ronstar on 02/04/11. Ally 100 lb to .4 acres or 240 lb/a. Ronstar applied is 2

Sand topdressing and fertilization 02/09/2011

06 herbicide application on 02/09/2011.

Honolulu City and County crew made a spot application to goose grass within the in-field area at 2 oz Revolver/gallon. Total of 2 gallons of spot treatment mix was applied. Chemical were applied after top dress see color on sand.

07 herbicide application on 04/12/11.

**Specticle** for goose grass at 3.85 oz/a (no more than 5 oz/application, no more than 7.1 oz/yr). Total area covered is .65 acres with 26 gallon tank applying 40 GPA at 13 PSI. Amount to add to 26 gallons is 2.5 oz or 73.9 grams. A 2.5 oz pack was split into 34 grams for the first batch and the remaining amount in the water soluble bag in the second batch. The entire 2.5 oz of Specticle was used on .65 acres for a reportable rate of 3.85 oz/a.

**Revolver** for goose grass at 26.2 oz/a. Total area covered is .65 acres with 26 gallons at 40 GPA at 13 PSI. Amount to add to 26 gallon tank is 17.03 oz or 504 ml. Make two applications of 26 gallons use 8.51 oz or 252 ml of Revolver

**Surfactant, Latron B 1956** with 100 ml/26 gallons (.1% v/v) amounts to 13 oz/100 gallons. This amount was added to both 26 gallon batches.

Observations on 06/20/11.

The weed control looked acceptable on goose grass although some escapes were present. Love grass was still green and normal looking above ground but clumps could be easily removed and revealed impressive root pruning. Star grass (*Chloris divaricata*) was still present and also appeared to easily pull out. The best action to make a big impact on weed removal at this stage would be to hand pull all these tough grassy weeds that are now loosely held in the soil.
Extending lesson for the Aiea ball field cleanup to the Waipio Soccer fields.

In March of 2011, the weed control techniques evaluated at the Aiea baseball field were adapted and used for in the Waipio soccer fields planted to common Bermuda grass. The weed control program started with a boom applied tank mix of foliar feed fertilizer (CN 9-0-0) and Specticle at 2.5 dry oz/a. The fertilizer starts the process of activating both weed and turf growth that improves the weed controlling influence of the herbicides and stimulates growth in the Bermuda grass. At 2 weeks after the first spray application and mixture of Celsius (3.7 oz/a) and Revolver (26 oz/a) with 1% MSO on a volume basis were applied across the entire surface of treated fields. Both liquid and granular fertilizers were applied during the next 25-35 day interval keep the Bermuda grass green and to rapidly fill in the gaps left by dying weeds. Once Goose grass survivors were observed, two application of Sencor 75DF were applied at the rate of 2/3 lb/a at 2 weeks apart. This sequence of sprays provided near complete weed control of the goose grass until late August 2012 with little to no new goose grass seed germination all summer. Lover grass (Eragrostis spp.) was not controlled by this spray sequence but plant root were weakened and much easier to pull out than untreated plants.