POTATO Solids MANAGEMENT Plan

Tyler Argo

INTRODUCTION

Plants need at least seventeen elements to grow. Three of these elements are hydrogen, carbon and oxygen which they get from air and water. The other fourteen elements such as Nitrogen (N), Potassium and Phosphorus come from the soil .

N is considered to be one of the most important nutrients for plants and crops as it can increase growth. Most soils are deficient in the type of readily available N, and chemical fertilizers or organic residuals such as manure or biosolids add N to the soil .

However, too much N can also pose a problem, not only to the plants themselves but to humans and the environment as well.

OVERVIEW OF PROJECT

The application of potato solids to the land acts as a fertilizer adding nutrients to the soil for crops to uptake.

OB-3 Resource Management (OB-3) operates a series of settling ponds where potato solids are produced from Washington Potato Company (WPC) and Lamb Weston/BSW (LW/BSW) located in Warden Washington.

Through an agreement with Cole Dairy Incorporated (CDI) also located in Warden Washington, OB-3 has agreed to give away the potato solids removed from the settling ponds as a nutrient source for CDI crop fields.

The water discharge from these two plants goes through two clarifiers. It is the effluent from these clarifiers that enters the pond system to begin its settling where there are two sets of 5 ponds.

Clarified wastewater flows through a set of 5 ponds for approximately 3 to 4 months, and up to 12 months to allow additional solids to settle. With the solids are adequately settled in the ponds, the wastewater flows to an additional train of ponds for further treatment prior to land application.

SITE DESCRIPTION

The fields at CDI where the solids will be applied are on level to gently rolling uplands and the generally flat bottoms of channeled scablands along State Highway 17. The general area is flat to gently rolling with areas of scabland and basalt outcrops. The land generally slopes to the south and east toward Moses Lake and Potholes Reservoir.

The Warden Industrial Wastewater Treatment Facility including the potato solids settling ponds and storage area is generally a flat terrace located at the upper end of a natural draw and adjacent to the north side of the East Low Canal. The topography is gently sloping to the north toward the Lind Coulee. The surrounding area consists of crop land to the north and west and east with the town of Warden, WA

Soil Map Units

Soil Types	Slopes	Soil textures	Surface Layer Depth	Subsoil Depth	Substratum Depth	Depth to Groundwater
	Percent		inches			
Prosser-Starbuck	0-15	Very fine sandy loam	5	16	26	>80
Quincy	0-15, 2-15	Loamy fine sand, fine sand	9	0	60	>80
Scoon	0-5, 5-15	Silt loam	6	10	16	>80
Shano	0-2, 2-5, 5-10, 15-35	Silt loam	8	19	60	>80
Burke	0-5, 5-15	Silt loam	6	34	60	>80
Taunton	0-2, 2-5	Silt loam	8	19	27	>80
Warden	0-2, 2-5, 5-10	Silt loam	6	26	60	>80
Starbuck	0-30	Stony silt loam	8	15	19	>80
Sagehill	2-5	Very fine sandy loam	8	19	60	>80

Potato Solid Chemical Properties

Sample	TKN	Organic N	NH_4-N	NO_3-N	Total N	Total Solids	pH	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	mg/kg					%	s.u.	mg/kg								
2008 Residual	14,225	13,465	760	364	14,589	69%	4.9	14.52	1.08	140.4	0.0164	2.33	22.32	< 2.31	< 1.12	471.9
2009 Residual	20,284	18,530	1,754	314	20,598	71%	6.4	12.33	0.66	115.7	0.0197	1.11	23.14	< 2.31	0.94	487.3
2010 Residual	65,905	57,338	8,567	239	66,144	13%	4.8	< 0.76	< 0.14	65.0	< 0.003	< 0.15	< 0.31	14.9	< 1.12	105.8
Average	33,471	29,778	3,694	306	33,777	51%	5.0	< 9.20	< 0.63	107.0	< 0.013	< 1.20	< 15.26	< 6.51	< 1.06	355.0

METHODS AND RESULTS

Nutrient and metal analysis is also needed for each field at CDI where the solids will be applied. The most recent analyses of the potato solids are from 2008, 2009, and 2010

A spreader truck from CDI will transport the potato solids from OB-3 to the CDI farm on both private and public roads to be applied to the CDI land application fields

Alfalfa hay -315 lb N/ac
Wheat - 150 lb N/ac
Silage corn -192 lb N/ac
Potatoes -280 lb N/ac

Plant available nitrogen (PAN) in the potato solids equals the inorganic available nitrogen plus the organic available nitrogen.

The inorganic available nitrogen equals NH_4-N multiplied by 0.5 plus NO_3-N.

The organic available nitrogen equals the organic nitrogen multiplied by 0.35.

Where laboratory results are reported in terms of mg/kg (dry weight basis), the results must be multiplied by 0.002 to convert mg/kg to lb/dry ton.

CONCLUSION

With these companies working with local farmers it creates stronger community ties where both profit from each other.

Instead of mass amounts of solids being wasted from the processing facilities they are recycled and put to use. The solids are now being used instead of chemical fertilizers which are costly to produce and can have adverse effects on the land.

The use of solids helps all those involved, CDI receive free fertilizer and WPC and LW/BSW get rid of the waste that they produce.

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