

PCS 84069

Buell, Thomas

From: Beringer, Mike <Beringer.Michael@epa.gov>
Sent: Thursday, April 8, 2021 11:23 AM
To: Buell, Thomas
Cc: Schumacher, Kelly
Subject: Soil Screening Levels
Attachments: Resident_chem_rsl_23MAR2021_prg2123119.pdf; 20210302-003.pdf

In follow-up to a request from NDEE, Kelly Schumacher (Region 7 Toxicologist) developed risk-based screening levels for compounds detected in soil at the Mead City Park. If you have any questions, please call me at 913-551-7351 or Kelly at 913-551-7963.

We used the EPA's Regional Screening Level (RSL) calculator

(https://gcc02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fepa-prgs.ornl.gov%2Fcgi-bin%2Fchemicals%2Fcsf_search&data=04%7C01%7Cweekley.erin%40epa.gov%7C8be1774ebcab42f077eb08d8efa19825%7C88b378b367484867acf976aacbeca6a7%7C0%7C0%7C637522824602967017%7CUnknown%7CTWFpbGZsb3d8eyJWljoIMC4wLjAwMDAiLCJQIjoiV2luMzliLCJBTiI6IjEhaWwiLCJXVCi6Mn0%3D%7C1000&data=qGT9EQbBOJZ%2FtZ1owfKxEc8h6JP%2BKht0XBZ1S2MXLU0%3D&reserved=0) to derive residential soil risk-based screening levels for the four compounds detected, or presumed to have been detected, in the Lab Test Results – 20210302-003 (see attachment) at the Mead City Park. This data showed detections of 38.0 µg/kg clothianidin, <5 µg/kg fluoxastrobin, 20.5 µg/kg glyphosate, and <5 µg/kg thiamethoxam. We interpret the "< 5" values as J-coded data, meaning the analyte was detected but could not be accurately quantified below the reporting limit of 5 µg/kg.

We used the EPA's standard default exposure parameters and equations for a residential scenario. That is, we used the same exposure assumptions that are used to generate all of the EPA's default residential soil RSLs. This includes default values of 1 for the relative bioavailability, 1 for the fraction of contaminant absorbed in the gastrointestinal tract (GIABS), and 0.1 for the dermal absorption factor for each pesticide. We did locate documents generated by the Office of Pesticide Programs (OPP) showing dermal absorption fractions of 1% for clothianidin, 2.3% for fluoxastrobin, and 5% for thiamethoxam, but we were not certain those are the most current values used by OPP. Use of the default of 0.1, or 10%, is consistent with how we derive residential soil RSLs for the Superfund and RCRA programs, and is more health-protective (i.e., conservative) than if we had used the dermal absorption fractions noted above.

Because two of the compounds, clothianidin and thiamethoxam, are in the neonicotinoid class of insecticides, while glyphosate is a herbicide and fluoxastrobin is a fungicide, we used a target non-cancer hazard quotient (HQ) of 1. However, clothianidin and thiamethoxam may share a common mode of action and common targets for non-cancer health effects.

None of the four compounds have inhalation reference concentrations, cancer inhalation unit risks, or oral cancer slope factors. We obtained the oral reference doses for clothianidin, fluoxastrobin, and thiamethoxam from the Human Health Benchmarks for Pesticides (HHBP) table (<https://www.epa.gov/pesticides/updated-list-human-health-benchmarks-pesticides-drinking-water-available>). The RSL calculator uses the Integrated Risk Information System (IRIS) oral reference dose for glyphosate and it is not in the HHBP table.

As shown in the attachment, the residential soil risk-based screening levels (target HQ=1 and rounded to two significant digits) are:

- Clothianidin = 6,200 mg/kg or 6,200,000 µg/kg
- Fluoxastrobin = 950 mg/kg or 950,000 µg/kg
- Thiamethoxam = 760 mg/kg or 760,000 µg/kg



- Glyphosate = 6,300 mg/kg or 6,300,000 µg/kg

Even accounting for potential additive health effects (by dividing each screening level by 10 to reflect a target HQ of 0.1), the concentrations detected in the single soil sample collected are well below the screening levels for each compound.

Mike Beringer, Chief
Applied Sciences Branch
U.S. EPA Region 7
11201 Renner Boulevard
Lenexa, KS 66219
(913) 551-7351

Site-specific Resident Soil Inputs

1

Variable	Resident Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
A (VF Dispersion Constant)	11.911	11.911
A (VF Dispersion Constant - mass limit)	11.911	11.911
B (PEF Dispersion Constant)	18.7762	18.7762
B (VF Dispersion Constant)	18.4385	18.4385
B (VF Dispersion Constant - mass limit)	18.4385	18.4385
City (PEF Climate Zone) Selection	Default	Default
City (VF Climate Zone) Selection	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
C (VF Dispersion Constant)	209.7845	209.7845
C (VF Dispersion Constant - mass limit)	209.7845	209.7845
foc (fraction organic carbon in soil) g/g	0.006	0.006
F(x) (function dependent on U_m/U_s) unitless	0.194	0.194
n (total soil porosity) L_{void}/L_{soil}	0.43396	0.43396
p_h (dry soil bulk density) g/cm ³	1.5	1.5
p_h (dry soil bulk density - mass limit) g/cm ³	1.5	1.5
PEF (particulate emission factor) m ³ /kg	1359344438	1359344438
p_c (soil particle density) g/cm ³	2.65	2.65
Q/C_{wind} (g/m ² -s per kg/m ³)	93.77	93.77
Q/C_{inl} (g/m ² -s per kg/m ³)	68.18	68.18
Q/C_{inl} (g/m ² -s per kg/m ³ - mass limit)	68.18	68.18
A_c (PEF acres)	0.5	0.5
A_c (VF acres)	0.5	0.5
A_c (VF mass-limit acres)	0.5	0.5
$AF_{n,7}$ (mutagenic skin adherence factor) mg/cm ²	0.2	0.2
$AF_{7,6}$ (mutagenic skin adherence factor) mg/cm ²	0.2	0.2
$AF_{6,16}$ (mutagenic skin adherence factor) mg/cm ²	0.07	0.07
$AF_{16,76}$ (mutagenic skin adherence factor) mg/cm ²	0.07	0.07
$AF_{res,ad}$ (skin adherence factor - adult) mg/cm ²	0.07	0.07
$AF_{res,cr}$ (skin adherence factor - child) mg/cm ²	0.2	0.2
AT_{res} (averaging time - resident carcinogenic)	365	365

Site-specific Resident Soil Inputs

2

Variable	Resident Soil Default Value	Form-input Value
BW _{n,7} (mutagenic body weight) kg	15	15
BW _{7,6} (mutagenic body weight) kg	15	15
BW _{6,16} (mutagenic body weight) kg	80	80
BW _{16,76} (mutagenic body weight) kg	80	80
BW _{res-a} (body weight - adult) kg	80	80
BW _{res-c} (body weight - child) kg	15	15
DFS _{res-a,6} (age-adjusted soil dermal factor) mg/kg	103390	103390
DFS _{res-a,6} (mutagenic age-adjusted soil dermal factor) mg/kg	428260	428260
ED _{res} (exposure duration) years	26	26
ED _{n,7} (mutagenic exposure duration) years	2	2
ED _{7,6} (mutagenic exposure duration) years	4	4
ED _{6,16} (mutagenic exposure duration) years	10	10
ED _{16,76} (mutagenic exposure duration) years	10	10
ED _{res-a} (exposure duration - adult) years	20	20
ED _{res-c} (exposure duration - child) years	6	6
EF _{res} (exposure frequency) days/year	350	350
EF _{n,7} (mutagenic exposure frequency) days/year	350	350
EF _{7,6} (mutagenic exposure frequency) days/year	350	350
EF _{6,16} (mutagenic exposure frequency) days/year	350	350
EF _{16,76} (mutagenic exposure frequency) days/year	350	350
EF _{res-a} (exposure frequency - adult) days/year	350	350
EF _{res-c} (exposure frequency - child) days/year	350	350
ET _{res} (exposure time) hours/day	24	24
ET _{n,7} (mutagenic exposure time) hours/day	24	24
ET _{7,6} (mutagenic exposure time) hours/day	24	24
ET _{6,16} (mutagenic exposure time) hours/day	24	24
ET _{16,76} (mutagenic exposure time) hours/day	24	24
ET _{res-a} (adult exposure time) hours/day	24	24
ET _{res-c} (child exposure time) hours/day	24	24
THQ (target hazard quotient) unitless	0.1	1
IFS _{res-a} (age-adjusted soil ingestion factor) mg/kg	36750	36750

Site-specific Resident Soil Inputs

3

Variable	Resident Soil Default Value	Form-input Value
IFSM _{rec-adt} (mutagenic age-adjusted soil ingestion factor) mg/kg	166833.3	166833.3
IRS _{ad} (mutagenic soil intake rate) mg/day	200	200
IRS _{ad} (mutagenic soil intake rate) mg/day	200	200
IRS _{ad} (mutagenic soil intake rate) mg/day	100	100
IRS _{ad} (mutagenic soil intake rate) mg/day	100	100
IRS _{rec-ad} (soil intake rate - adult) mg/day	100	100
IRS _{rec-ch} (soil intake rate - child) mg/day	200	200
LT (lifetime) years	70	70
SA _{ad} (mutagenic skin surface area) cm ² /day	2373	2373
SA _{ad} (mutagenic skin surface area) cm ² /day	2373	2373
SA _{ad} (mutagenic skin surface area) cm ² /day	6032	6032
SA _{ad} (mutagenic skin surface area) cm ² /day	6032	6032
SA _{rec-ad} (skin surface area - adult) cm ² /day	6032	6032
SA _{rec-ch} (skin surface area - child) cm ² /day	2373	2373
TR (target risk) unitless	1.0E-06	1.0E-06
T _{gw} (groundwater temperature) Celsius	25	25
Theta _a (air-filled soil porosity) L _{air} /L _{soil}	0.28396	0.28396
Theta _w (water-filled soil porosity) L _{water} /L _{soil}	0.15	0.15
T (exposure interval) s	819936000	819936000
T (exposure interval) yr	26	26
U _m (mean annual wind speed) m/s	4.69	4.69
U _t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Site-specific

Resident Regional Screening Levels (RSL) for Soil

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	SF ₀ (mg/kg-day) ⁻¹	SF ₀ Ref (ug/m ³) ⁻¹	IUR (ug/m ³) ⁻¹	IUR Ref (mg/kg-day)	RfD Ref (mg/kg-day)	RfD Ref (mg/m ³)	RfC Ref	RfC GIABS
Added Chemical - Clothianidin	NA	No	No	Organics	-	-	-	9.80E-02	U	-	-	1
Added Chemical - Fluoxastrobin	NA	No	No	Organics	-	-	-	1.50E-02	U	-	-	1
Added Chemical - Thiamethoxam	NA	No	No	Organics	-	-	-	1.20E-02	U	-	-	1
Glyphosate	1071-83-6	No	No	Organics	-	-	-	1.00E-01	U	-	-	1

Site-specific

5

Resident Regional Screening Levels (RSL) for Soil

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

ABS	RBA	Soil Saturation Concentration (mg/kg)	S (mg/L)	K_{oc} (cm ³ /g)	K_d (cm ³ /g)	HLC (atm-m ³ /mole)	Henry's Law Constant Used in Calcs (unitless)	H [*] and HLC Ref	Normal Boiling Point (K)	BP Ref	Critical Temperature (K)	TC Ref	Chemical Type	D_{10} (cm ² /s)
0.1	1	-	-	-	-	-	-	-	-	-	-	-	PEST	-
0.1	1	-	-	-	-	-	-	-	-	-	-	-	PEST	-
0.1	1	-	-	-	-	-	-	-	-	-	-	-	PEST	-
0.1	1	-	1.05E+04	2.10E+03	-	2.10E-12	8.59E-11	U	690.15	U	-	-	SVOC	6.21E-02

Site-specific

6

Resident Regional Screening Levels (RSL) for Soil

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

D _{iv} \ (cm ² /s)	D _A \ (cm ² /s)	Particulate Emission Factor (m ³ /kg)	Volatilization Factor (m ³ /kg)	Ingestion SL TR=1E-06 (mg/kg)	Dermal SL TR=1E-06 (mg/kg)	Inhalation SL TR=1E-06 (mg/kg)	Carcinogenic SL TR=1E-06 (mg/kg)	Ingestion SL Child THQ=1 (mg/kg)	Dermal SL Child THQ=1 (mg/kg)	Inhalation SL Child THQ=1 (mg/kg)	Noncarcinogenic SL Child THI=1 (mg/kg)
-	-	1.36E+09	-	-	-	-	-	7.67E+03	3.23E+04	-	6.19E+03
-	-	1.36E+09	-	-	-	-	-	1.17E+03	4.94E+03	-	9.48E+02
-	-	1.36E+09	-	-	-	-	-	9.39E+02	3.96E+03	-	7.59E+02
7.26E-06	-	1.36E+09	-	-	-	-	-	7.82E+03	3.30E+04	-	6.32E+03

Site-specific

7

Resident Regional Screening Levels (RSL) for Soil

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Ingestion SL Adult THQ=1 (mg/kg)	Dermal SL Adult THQ=1 (mg/kg)	Inhalation SL Adult THQ=1 (mg/kg)	Noncarcinogenic SL Adult THI=1 (mg/kg)	Screening Level (mg/kg)
8.18E+04	1.94E+05	-	5.75E+04	6.19E+03 nc
1.25E+04	2.96E+04	-	8.80E+03	9.48E+02 nc
1.00E+04	2.37E+04	-	7.04E+03	7.59E+02 nc
8.34E+04	1.98E+05	-	5.87E+04	6.32E+03 nc

Performed By:

South Dakota Agricultural Laboratories
 1335 Western Avenue
 Brookings, South Dakota 57006
 Phone: 605-692-7325
 E-Mail: regina.wixon@sdaglabs.com

Collected By:

Nebraska Dept. of Environment and Energy
 PO Box 98922
 Lincoln, NE 68509
 Phone: 402-471-3377
 E-Mail: wade.gregson@nebraska.gov

Report Date: 2021-03-22**Final Report****South Dakota Agricultural Laboratories has examined the sample of**

Limfinite Package Id : 20210302-003
 Lab Sample Id : 21PE001461
 Customer Sample Id : City Park
 Sample Description : Soil/Composite
 Date Collected : 2021-02-26
 Date Received : 2021-03-02

RESULTS

ANALYTE	UNIT	AS RECEIVED	DETECTION LIMIT	METHOD	DATE OF EXTRACTION	DATE OF ANALYSIS
Abamectin	ppb	ND	10	LC-MS/MS	2021-03-03	2021-03-11
Acetamprid	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-05
Azoxystrobin	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-05
Brassinazole	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-04
Clothianidin	ppb	38.0	10	LC-MS/MS	2021-03-12	2021-03-13
Cyproconazole	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-04
Desthio-Prothioconazole	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-04
Difenoconazole	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-04
Dimoxystrobin	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-05
Dinotefuran	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-05
Epoxiconazole	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-04
Fluconazole	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-04
Fluoxastrobin	ppb	<5	5	LC-MS/MS	2021-03-03	2021-03-05
				J. Agric. Food		
Glufosinate	ppb	ND	10	Chem. 34 535-538	2021-03-03	2021-03-05
				J. Agric. Food		
Glyphosate	ppb	20.5	10	Chem. 34 535-538	2021-03-03	2021-03-05
Imidacloprid	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-05
Ipconazole	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-04
Isavuconazole	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-04
Metconazole	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-04
Nitenpyram	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-05
Orysastrobin	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-05
Picoxystrobin	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-05
Propiconazole	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-04
Prothioconazole	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-04
Pyraclostrobin	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-05

Ravuconazole	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-04
Sulfonic Acid Prothioconazole	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-04
Tebuconazole	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-04
Tetraconazole	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-04
Thiabendazole	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-04
Thiacloprid	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-05
Thiamethoxam	ppb	<5	5	LC-MS/MS	2021-03-03	2021-03-05
Trifloxystrobin	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-05
Uniconazole	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-04
Voriconazole	ppb	ND	5	LC-MS/MS	2021-03-03	2021-03-04

QUALITY ASSURANCE

ANALYTE	UNIT	DUPLICATE	SPIKE RECOVERY	MATRIX BLANK	PROCESS BLANK	INSTRUMENT BLANK
Abamectin	ppb	ND	87.1	ND	ND	ND
Acetamprid	ppb	ND	118	ND	ND	ND
Azoxystrobin	ppb	ND	96.4	ND	ND	ND
Brassinazole	ppb	ND	114	ND	ND	ND
Clothianidin	ppb	53.6	120	ND	ND	ND
Cyproconazole	ppb	ND	94.1	ND	ND	ND
Desthio-Prothioconazole	ppb	ND	107	ND	ND	ND
Difenoconazole	ppb	ND	102	ND	ND	ND
Dimoxystrobin	ppb	ND	127	ND	ND	ND
Dinotefuran	ppb	ND	122	ND	ND	ND
Epoxiconazole	ppb	ND	113	ND	ND	ND
Fluconazole	ppb	ND	94.4	ND	ND	ND
Fluoxastrobin	ppb	1.84j	110	ND	ND	ND
Glufosinate	ppb	ND	96.0	ND	ND	ND
Glyphosate	ppb	10.6	75.1	ND	ND	ND
Imidacloprid	ppb	ND	124	ND	ND	ND
Ipconazole	ppb	ND	105	ND	ND	ND
Isavuconazole	ppb	ND	93.7	ND	ND	ND
Metconazole	ppb	ND	105	ND	ND	ND
Nitenpyram	ppb	ND	99.8	ND	ND	ND
Orysastrobin	ppb	ND	110	ND	ND	ND
Picoxystrobin	ppb	ND	109	ND	ND	ND
Propiconazole	ppb	ND	103	ND	ND	ND
Prothioconazole	ppb	ND	100	ND	ND	ND
Pyraclostrobin	ppb	ND	115	ND	ND	ND
Ravuconazole	ppb	ND	103	ND	ND	ND
Sulfonic Acid Prothioconazole	ppb	ND	92.7	ND	ND	ND
Tebuconazole	ppb	ND	109	ND	ND	ND
Tetraconazole	ppb	ND	105	ND	ND	ND
Thiabendazole	ppb	ND	84.1	ND	ND	ND
Thiacloprid	ppb	ND	118	ND	ND	ND
Thiamethoxam	ppb	3.61j	117	ND	ND	ND
Trifloxystrobin	ppb	ND	113	ND	ND	ND
Uniconazole	ppb	ND	108	ND	ND	ND
Voriconazole	ppb	ND	107	ND	ND	ND

Comments:

Definitions:

ppb - parts per billion

Detection Limit - Lowest concentration that can be quantitatively reported with confidence

ND - Not Detected above the limit of quantification

Duplicate - Concentration found in repeat sample analysis

Spike Recovery - Recovery based on a known amount of active ingredient spiked into a similar-matrix, blank sample

Matrix Blank - A similar-matrix, blank sample is evaluated

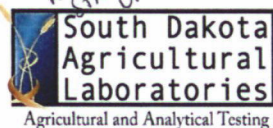
Process Blank - A sample without any matrix (soil, vegetation etc) is processed through the sample analysis procedure

Instrument Blank - Injection solvent is run to demonstrate no carryover between injections on the instrument

Reviewed and approved by Regina Wixon, Ph.D.

Submitted by the customer:

*Abamectin
Azoles
Neonics
Strobins
OP*



Chain of Custody

2021 0302-003
21NE001461

20210302-003
21NE001461

ies

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Nebraska Department of Environment and Energy

Contact Information					
Company / Organization:		NDEE		Address: PO Box 98922, Lincoln, NE 68509	
Contact:		Wade Gregson		Email: Wade.Gregson@nebraska.gov	
Phone:		402-471-3377		Special Instructions:	
Project Site / Sampling Event		Mead Public Park Ag Chemicals Soil Screen			
Date of Sample Collection		26 Feb 2021			
Sample ID	Time Collected	Sample Media / Type	Number of Containers	Description / Notes	
City Park	1900 hrs	Soil	1	Composite	X
					X
					X
					X
				See Attached Screen List	

Sample Type Codes	
VE - vegetation	CI - clothing
SO - soil	AN - animal
SW - swab	DDG - dried distiller's grains
WA - water	

Turn-around-times
Special charges apply for RUSH samples. Please contact the laboratory before sending.

Commercial Carrier	United Parcel Service	Sample(s) Received at SD Ag Labs
Date/Time Relinquished to Carrier	1 Mar 2021	Date 2021 03-02
Number of Ice Chest(s) Shipped	1 (one)	Received by Alyssa Kennedy

Relinquished By	Date & Time	Received By	Date & Time
Rout/Dish/EA	2/26/2021 1600	Kennedy	2021 03-02
402-817-7616			