

NC DENR

Division of Waste Management - Solid Waste

Environmental Monitoring Reporting Form

Notice: This form and any information attached to it are "Public Records" as defined in NC General Statute 132-1. As such, these documents are available for inspection and examination by any person upon request (NC General Statute 132-6).

Instructions:

- Prepare one form for each individually monitored unit.
- Please type or print legibly.
- Attach a notification table with values that attain or exceed NC 2L groundwater standards or NC 2B surface water standards. The notification must include a preliminary analysis of the cause and significance of each value. (e.g. naturally occurring, off-site source, pre-existing condition, etc.).
- Attach a notification table of any groundwater or surface water values that equal or exceed the reporting limits.
- Attach a notification table of any methane gas values that attain or exceed explosive gas levels. This includes any structures on or nearby the facility (NCAC 13B .1629 (4)(a)(i)).
- Send the original signed and sealed form, any tables, and Electronic Data Deliverable to: Compliance Unit, NCDENR-DWM, Solid Waste Section, 1646 Mail Service Center, Raleigh, NC 27699-1646.

Solid Waste Monitoring Data Submittal Information

Name of entity submitting data (laboratory, consultant, facility owner):

Richardson Smith Gardner and Associates, Inc.

Contact for questions about data formatting. Include data preparer's name, telephone number and E-mail address:

Name: Joan A. Smyth, P.G. Phone: 919-828-0577 x 122
 E-mail: joan@rsgengineers.com

Facility name:	Facility Address:	Facility Permit #	NC Landfill Rule: (.0500 or .1600)	Actual sampling dates (e.g., October 20-24, 2006)
Washington County Closed MSW Landfill	718 Landfill Road Roper, NC	94-01	.0500	September 3, 2009

Environmental Status: (Check all that apply)

- Initial/Background Monitoring Detection Monitoring Assessment Monitoring Corrective Action

Type of data submitted: (Check all that apply)

- Groundwater monitoring data from monitoring wells Methane gas monitoring data
 Groundwater monitoring data from private water supply wells Corrective action data (specify) _____
 Leachate monitoring data Other(specify) _____
 Surface water monitoring data

Notification attached?

- No. No groundwater or surface water standards were exceeded.
 Yes, a notification of values exceeding a groundwater or surface water standard is attached. It includes a list of groundwater and surface water monitoring points, dates, analytical values, NC 2L groundwater standard, NC 2B surface water standard or NC Solid Waste GWPS and preliminary analysis of the cause and significance of any concentration.
 Yes, a notification of values exceeding an explosive methane gas limit is attached. It includes the methane monitoring points, dates, sample values and explosive methane gas limits.

Certification

To the best of my knowledge, the information reported and statements made on this data submittal and attachments are true and correct. Furthermore, I have attached complete notification of any sampling values meeting or exceeding groundwater standards or explosive gas levels, and a preliminary analysis of the cause and significance of concentrations exceeding groundwater standards. I am aware that there are significant penalties for making any false statement, representation, or certification including the possibility of a fine and imprisonment.

Joan A. Smyth, P.G. Senior Hydrogeologist 919-828-0577 x 122
 Facility Representative Name (Print) Title (Area Code) Telephone Number
 Affix NC Licensed Professional Geologist Seal

Joan A. Smyth Signature 10/30/09 Date

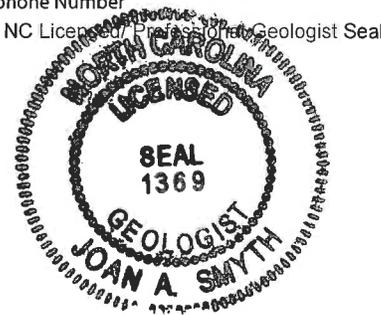
14 N. Boylan Avenue Raleigh, NC 27603

Facility Representative Address

C)828

NC PE Firm License Number (if applicable effective May 1, 2009)

Revised 6/2009



Washington County Closed MSW Landfill

Ground Water Monitoring Report

Fall 2009 Semi-annual Monitoring Event

**Washington County Closed MSW Landfill
Plymouth, North Carolina
NC Solid Waste Permit # 94-01-MSWLF-1980**

Prepared for:
Washington County
P.O. Box 1007
Plymouth, North Carolina 27962

November 2009



PRINTED ON 100% RECYCLED PAPER

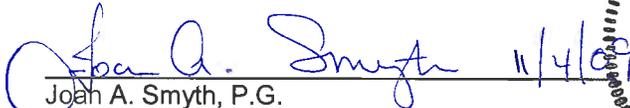
Fall 2009 Ground Water Monitoring Report

Washington County Closed MSW Landfill Washington, North Carolina NC Solid Waste Permit # 94-01 MSWLF-1980

Prepared for:

Washington County Solid Waste
P.O. Box 1007
Plymouth, North Carolina 27962

RSG Project No. **Wash 08-2**


Joan A. Smyth, P.G.
Senior Hydrogeologist



November 2009



PRINTED ON 100% RECYCLED PAPER

Washington County Closed MSW Landfill

**Semi-annual Ground Water Monitoring Report
Fall 2009 Event**

1.0 INTRODUCTION1

2.0 SAMPLING PROCEDURES1

3.0 FIELD AND LABORATORY RESULTS1

 3.1 Laboratory Analysis.....1

 3.2 Field and Laboratory Results.....1

4.0 GROUND WATER CHARACTERIZATION.....2

5.0 CONCLUSIONS.....2

FIGURES

Figure 1 – Washington County Landfill Site Map

TABLES

- Table 1 – Groundwater Elevations
- Table 2 – Field Parameter Results
- Table 3 – Detected Inorganic Constituents
- Table 4 – Detected Organic Constituents

APPENDICES

Appendix A – Laboratory Analytical Reports

1.0 Introduction

The Washington County Closed MSW Landfill, operating under Solid Waste Permit #94-01-MSWLF-1980 is required to submit semi-annual ground water monitoring reports for ground water monitoring. This report presents the results of the second semiannual monitoring event for 2009, conducted on September 3rd, 2009.

This report includes summaries of the field procedures, laboratory analyses, and ground water characterization. Also included are laboratory analytical reports.

2.0 Sampling Procedures

The sampling event, performed by Environment 1, Inc. on September 3rd, 2009, consisted of collecting samples from four (4) ground water wells (MW-1 through MW-4) in accordance with the approved site Sampling and Analysis Plan. Also included in the analysis were trip and field blanks for quality control.

Sampling methods followed the protocol outlined in the North Carolina Water Quality Monitoring Guidance Document for Solid Waste Facilities (North Carolina Department of Environment and Natural Resources, Division of Waste Management). The depth to water in each well was gauged prior to purging and sampling. Field measurements of pH, specific conductivity, and temperature were obtained from each well.

All samples were collected in laboratory prepared containers for the specified analytical procedures. Sampling equipment (Teflon bailers) were cleaned in the laboratory and transported to the site in aluminum foil. Ground water samples were properly preserved, placed on ice, and transported to the laboratory facility within the specified holding times for each analysis.

3.0 Field & Laboratory Results

3.1 Laboratory Analysis

The ground and surface water samples were transported to Environment 1, Inc., a North Carolina certified laboratory (NC Wastewater ID #10). Laboratory analysis consisted of the full suite of RCRA Subtitle D Appendix I constituents plus previously detected Appendix II constituents, and chloride. Parameters were reported at NC DWM Solid Waste Section Limits (SWSLs). The laboratory analytical report is included as **Appendix A**. No surface water samples are required for monitoring this site.

3.2 Field and Laboratory Results

The field parameter results are included in **Table 2**, while detected constituents are presented in **Tables 3 & 4**. One (1) inorganic constituent, cadmium (MW-1 & MW-2) was detected above the SWSL and shown in **Table 3**. These constituents were detected below the 2L ground water standards.

Three (3) organic constituents (1,4-dichlorobenzene, benzene and chlorobenzene) were detected

above the SWSL in MW-2 and MW-3 shown in **Table 4**. Of these, two (2) were found at concentrations above their respective 2L standards. These included:

- benzene and
- 1, 4-dichlorobenzene.

Constituents detected below the SWSL are denoted as “J” values and are also included in **Tables 3 & 4**.

4.0 Ground Water Characterization

A potentiometric surface map was prepared from ground water elevation data collected during this sampling event. The data indicates that ground water is flowing to the northeast. Hydraulic conductivity data is not available for these wells so ground water velocities could not be calculated. The potentiometric surface map (**Figure 1**) is also attached for your review.

5.0 Conclusions

The data indicates relatively stable ground water quality at the Washington County Closed MSW Landfill. The next ground water monitoring event is scheduled for March 2010. Results will be reported upon completion of laboratory analysis.

Figures

LEGEND

-  EXISTING 10' CONTOUR (SEE REFERENCE 1)
-  EXISTING 2' CONTOUR
-  STREAM/POND/DITCH BOUNDARY
-  1.5 POTENTIOMETRIC SURFACE (DASHED WHERE INFERRED)
-  WETLANDS BOUNDARY AREA (SEE REFERENCE 1)
-  DIRECTION OF GROUNDWATER FLOW
-  MW-1 MONITORING WELL

WETLANDS (TYP.)

MW-2
TOC=9.70
DTW=8.18
GWE=1.52

MW-3
TOC=11.30
DTW=9.66
GWE=1.64

CLOSED MSW
LANDFILL

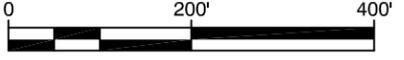
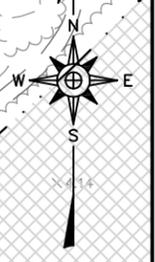
MW-1
TOC=10.01
DTW=7.91
GWE=2.10

MW-4
TOC=9.02
DTW=6.35
GWE=2.67

C&D LANDFILL

EXISTING COVER SOIL
BORROW AREA

LCID AREA



REFERENCES

1. OVERALL SITE BASE TOPOGRAPHY WETLAND, STREAM, AND DITCH BOUNDARIES PROVIDED BY SANBORN, BASED ON MARCH 28, 2009 AERIAL SURVEY.
2. COORDINATE SYSTEM IS STATE PLANE GRID.
3. WELL LOCATIONS OBTAINED FROM FROM THE WASHINGTON COUNTY LANDFILL MONITOR WELL SURVEY REPORT DATED APRIL 24, 2009.
4. DATA FROM ENVIRONMENT 1 LABORATORY REPORT DATED 9/3/09, I.D. #6018.

G:\CAD\Washington County\Wash 08-2\lsheets\WASH-B0016.dwg - 10/20/2009 1:57 PM

RICHARDSON SMITH GARDNER & ASSOCIATES
INC. LIC. NO. C-0028 (Engineering)
 www.rsgengineers.com

PH: 919-826-0577
 FAX: 919-826-3899

FIGURE NO.	2	FILE NAME	WASH-B0016
SCALE:	AS SHOWN	PROJECT NO.	WASH 08-2
CHECKED BY:	J.A.S.	DATE:	Oct. 2009
DRAWN BY:	C.T.J.		

**WASHINGTON COUNTY
 MSW LANDFILL
 POTENTIOMETRIC SURFACE MAP
 FALL 2009**

Tables

Table 1
Groundwater Elevation Data
Washington County MSW Landfill
9/3/2009

Well	Northing	Easting	TOC Elevation (feet)	Water Level (feet)	GW Elev (feet)
MW-1	797426.27	2691416.85	10.01	7.91	2.1
MW-2	798555.67	2690813.33	9.7	8.18	1.52
MW-3	797500.35	2689659.95	11.3	9.66	1.64
MW-4	796852.09	2690320.91	9.02	6.35	2.67

Data from Environment 1 laboratory report dated 9/03/09, ID# 6018.

Well locations and elevations provided by Sanborn, Charlotte, NC from field survey conducted on 4/8/09.

Table 2
Field Parameter Results
Washington County MSW Landfill
9/3/2009

Well	pH (Std units)	Spec Cond (umhos/cm)	Temp (celsius)	Static Water Level (feet)
MW-1	5.1	478	18	7.91
MW-2	6.6	1398	21	8.18
MW-3	5.9	276	19	9.66
MW-4	5.6	99	18	6.35

Note: PH measured with a 'Hanna" pH/EC/TDS Meter, type HI9811
 Temperature measured with a laboratory grade thermometer.
 Data from Environment 1 laboratory report dated 9/03/09, ID# 6018.

Table 3
Detected Inorganic Constituents
Washington County Closed MSW Landfill
9/3/2009

Parameter	SWSL	2L	MW-1	MW-2	MW-3	MW-4
Arsenic	10	50	1.2 J	1.3 J	2.4 J	0.5 J
Barium	100	2000	29.1 J	15.6 J	71.3 J	15.2 J
Cadmium	1	1.75	1.5	1.1	0.4 J	0.4 J
Total Chromium	10	50	0.2 J	0.8 J	2.8 J	0.3 J
Lead	10	15	0.5 J	0.8 J	6.3 J	0.4 J
Mercury	0.2	1.05	ND	0.05 J	0.03 J	ND
Selenium	10	50	4.3 J	2.2 J	1.2 J	0.3 J
Silver	10	17.5	ND	0.2 J	0.1 J	ND

- SWSL - Solid Waste Quantitation Limit
- ND - Not detected at or above SWSL
- Shading - Levels above 2L standard or no 2L standard
- Bold Letters - Constituent detected above SWSL
- J - Detected constituents below SWSL limit

All SWSLs, 2L Standards and Results are in ug/l.
Data from Environment 1 laboratory report dated 9/03/09, ID# 6018.



By: KBS
Date: 9/16/2009

Table 4
Detected Organic Constituents
Washington County MSW Landfill
9/3/2009

Parameter	SWSL	2L or GWP Standard	MW-1	MW-2	MW-3	MW-4
Vinyl Chloride	1	0.015	ND	0.9 J	ND	ND
1,2-Dichlorobenzene	5	24	ND	ND	0.2 J	ND
1,4-Dichlorobenzene	1	1.4	ND	4.3	2	ND
Acetone	100	700	ND	1.4 J	ND	ND
Benzene	1	1	ND	1.9	0.4 J	ND
2-Butanone	100	4200	ND	ND	0.9 J	ND
Toluene	1	1000	ND	0.2 J	ND	ND
Chlorobenzene	1	50	ND	7.8	9.8	ND

Note: All results in ug/l (ppb)

- ND - Not detected at or above SWSL
- Shading - Levels above 2L standard or no 2L standard
- Bold Letters - Levels below 2L standard
- SWSL - Solid Waste Section Quantitation Limits
- J - Detected constituents below the SWSL limit.
- 2L - Groundwater Standards (15A NCAC 2L 0200).
- GWP - Groundwater Protection Standards.

Note: Lab data analyzed by Environmental 1, Inc. ID# 6030 September 3, 2009.

Appendix A

Laboratory Analytical Report

Environment 1, Incorporated

Drinking Water ID: 1777
 Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
 GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
 FAX (252) 756-0633

ID#: 6018

WASHINGTON CO. LANDFILL
 MR. CARL CRITCHER
 P.O. BOX 1007
 PLYMOUTH ,NC 27962

DATE COLLECTED: 09/03/09
 DATE REPORTED : 10/08/09

REVIEWED BY: 

PARAMETERS	MDL	SWSL	Well	Well	Well	Well	Analysis	Method	
			#1	#2	#3	#4	Date		Analyst
PH (field measurement), Units			5.1	6.6	5.9	5.6	09/03/09	RJH	SM4500HB
Arsenic, ug/l	0.17	10.0	1.2 J	1.3 J	2.4 J	0.5 J	09/10/09	LFJ	EPA200.8
Barium, ug/l	0.04	100.0	29.1 J	15.6 J	71.3 J	15.2 J	09/10/09	LFJ	EPA200.8
Cadmium, ug/l	0.04	1.0	1.5	1.1	0.4 J	0.4 J	09/10/09	LFJ	EPA200.8
Total Chromium, ug/l	0.10	10.0	0.2 J	0.8 J	2.8 J	0.3 J	09/10/09	LFJ	EPA200.8
Lead, ug/l	0.04	10.0	0.5 J	0.8 J	6.3 J	0.4 J	09/10/09	LFJ	EPA200.8
Mercury, ug/l	0.03	0.20	--- U	0.05 J	0.03 J	---	09/10/09	LFJ	EPA200.8
Selenium, ug/l	0.12	10.0	4.3 J	2.2 J	1.2 J	0.3 J	09/10/09	LFJ	EPA200.8
Silver, ug/l	0.04	10.0	--- U	0.2 J	0.1 J	---	09/10/09	LFJ	EPA200.8
Conductivity (at 25c), uMhos	1.0	1.0	478	1398	276	99	09/03/09	RJH	SM2510B
Temperature, °C			18	21	19	18	09/03/09	RJH	SM2550B
Static Water Level, feet			7.91	8.18	9.66	6.35	09/03/09	RJH	
Well Depth, feet			23.09	19.30	19.97	22.90	09/03/09	RJH	

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

Environment 1, Incorporated

Drinking Water ID: 37113
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: WASHINGTON CO. LANDFILL
MR. CARL CRITCHER
P.O. BOX 1007
PLYMOUTH, NC 27962

CLIENT ID: 6018

ANALYST: MAO
DATE COLLECTED: 09/03/09
DATE ANALYZED: 09/17/09
DATE REPORTED: 10/08/09

Page: 1

REVIEWED BY: 

VOLATILE ORGANICS EPA METHOD 8260B

PARAMETERS, ug/l	MDL	SWSL	Well #1	Well #2	Well #3	Well #4
1. Chloromethane	0.18	1.0	--- U	--- U	--- U	--- U
2. Vinyl Chloride	0.34	1.0	--- U	0.90 J	--- U	--- U
3. Bromomethane	0.26	10.0	--- U	--- U	--- U	--- U
4. Chloroethane	0.29	10.0	--- U	--- U	--- U	--- U
5. Trichlorofluoromethane	0.13	1.0	--- U	--- U	--- U	--- U
6. 1,1-Dichloroethane	0.14	5.0	--- U	--- U	--- U	--- U
7. Acetone	1.21	100.0	--- U	1.40 J	--- U	--- U
8. Iodomethane	0.12	10.0	--- U	--- U	--- U	--- U
9. Carbon Disulfide	0.14	100.0	--- U	--- U	--- U	--- U
10. Methylene Chloride	0.14	1.0	--- U	--- U	--- U	--- U
11. trans-1,2-Dichloroethane	0.13	5.0	--- U	--- U	--- U	--- U
12. 1,1-Dichloroethane	0.16	5.0	--- U	--- U	--- U	--- U
13. Vinyl Acetate	0.20	50.0	--- U	--- U	--- U	--- U
14. Cis-1,2-Dichloroethane	0.14	5.0	--- U	--- U	--- U	--- U
15. 2-Butanone	0.85	100.0	--- U	--- U	0.90 J	--- U
16. Bromochloromethane	0.11	3.0	--- U	--- U	--- U	--- U
17. Chloroform	0.13	5.0	--- U	--- U	--- U	--- U
18. 1,1,1-Trichloroethane	0.11	1.0	--- U	--- U	--- U	--- U
19. Carbon Tetrachloride	0.13	1.0	--- U	--- U	--- U	--- U
20. Benzene	0.16	1.0	--- U	1.90	0.40 J	--- U
21. 1,2-Dichloroethane	0.12	1.0	--- U	--- U	--- U	--- U
22. Trichloroethene	0.13	1.0	--- U	--- U	--- U	--- U
23. 1,2-Dichloropropane	0.17	1.0	--- U	--- U	--- U	--- U
24. Bromodichloromethane	0.13	1.0	--- U	--- U	--- U	--- U
25. Cis-1,3-Dichloropropene	0.17	1.0	--- U	--- U	--- U	--- U
26. 4-Methyl-2-Pentanone	0.68	100.0	--- U	--- U	--- U	--- U
27. Toluene	0.13	1.0	--- U	0.20 J	--- U	--- U
28. trans-1,3-Dichloropropene	0.14	1.0	--- U	--- U	--- U	--- U
29. 1,1,2-Trichloroethane	0.20	1.0	--- U	--- U	--- U	--- U
30. Tetrachloroethene	0.16	1.0	--- U	--- U	--- U	--- U
31. 2-Hexanone	1.00	50.0	--- U	--- U	--- U	--- U
32. Dibromochloromethane	0.14	3.0	--- U	--- U	--- U	--- U
33. 1,2-Dibromoethane	0.13	1.0	--- U	--- U	--- U	--- U
34. Chlorobenzene	0.13	3.0	--- U	7.80	9.80	--- U
35. 1,1,1,2-Tetrachloroethane	0.14	5.0	--- U	--- U	--- U	--- U
36. Ethylbenzene	0.16	1.0	--- U	--- U	--- U	--- U
37. Xylenes	0.48	5.0	--- U	--- U	--- U	--- U
38. Dibromomethane	0.17	10.0	--- U	--- U	--- U	--- U
39. Styrene	0.16	1.0	--- U	--- U	--- U	--- U
40. Bromoform	0.11	3.0	--- U	--- U	--- U	--- U
41. 1,1,2,2-Tetrachloroethane	0.16	3.0	--- U	--- U	--- U	--- U
42. 1,2,3-Trichloropropane	0.06	1.0	--- U	--- U	--- U	--- U
43. 1,4-Dichlorobenzene	0.21	1.0	--- U	4.30	2.00	--- U
44. 1,2-Dichlorobenzene	0.13	5.0	--- U	--- U	0.20 J	--- U
45. 1,2-Dibromo-3-Chloropropane	0.26	13.0	--- U	--- U	--- U	--- U
46. Acrylonitrile	1.49	200.0	--- U	--- U	--- U	--- U
47. trans-1,4-Dichloro-2-Butene	0.14	100.0	--- U	--- U	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

CHAIN OF CUSTODY RECORD

Environment 1, Inc.
 P.O. Box 7085, 114 Oakmont Dr.
 Greenville, NC 27858

Phone (252) 756-6208 • Fax (252) 756-0633

CLIENT: 6018

Week: 37

WASHINGTON CO. LANDFILL
 MR. CARL CRITCHER
 P.O. BOX 1007
 PLYMOUTH NC 27962

(252) 793-5615

SAMPLE LOCATION	COLLECTION		TOTAL CHLORINE, mg/l AT COLLECTION	TEMPERATURE, °C AT COLLECTION	# OF CONTAINERS	Field pH	Metals	Conductivity	Temperature	Field Parameter	EPA 8260B	8260 Dup. 1	8260 Dup. 2	PARAMETERS	CHEMICAL PRESERVATION	CONTAINER TYPE, P/G	pH CHECK (LAB)	CHLORINE NEUTRALIZED AT COLLECTION
	DATE	TIME																
Well #1	09/03/09	1205	18	5	G	G	G	G	G	G	G	G	G					
Well #2	09/03/09	1040	21	4	G	G	G	G	G	G	G	G	G					
Well #3	09/03/09	1020	19	4	G	G	G	G	G	G	G	G	G					
Well #4	09/03/09	1000	18	4	G	G	G	G	G	G	G	G	G					
DISINFECTION: <input type="checkbox"/> CHLORINE <input type="checkbox"/> UV <input type="checkbox"/> NONE																		
CHAIN OF CUSTODY MAINTAINED DURING SHIPMENT/DELIVERY: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N																		
CLASSIFICATION: <input type="checkbox"/> WASTEWATER (NPDES) <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> DWQ/GW <input checked="" type="checkbox"/> SOLID WASTE SECTION																		
A - NONE D - NAOH B - HNO ₃ E - HCL C - H ₂ SO ₄ F - ZINC ACETATE G - NATHIOSULFATE																		
SAMPLES COLLECTED BY: <i>H. Lopez</i> 4 of 04 (Release Print)																		
SAMPLES RECEIVED IN LAB AT <u>04</u> °C																		
RELINQUISHED BY (SIG.) (SAMPLER) <i>H. Lopez</i> 09/03/09 12:08												RECEIVED BY (SIG.) <i>B. J. A.</i> 9/3/08 2:08						
RELINQUISHED BY (SIG.)												RECEIVED BY (SIG.)						
RELINQUISHED BY (SIG.)												RECEIVED BY (SIG.)						
COMMENTS:																		

No 182030

Sampler must place a "C" for composite sample or a "G" for Grab sample in the blocks above for each parameter requested.

PLEASE READ Instructions for completing this form on the reverse side.