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Form **990-PF**Department of the Treasury
Internal Revenue Service**Return of Private Foundation**
or Section 4947(a)(1) Nonexempt Charitable Trust
Treated as a Private Foundation**Note** The foundation may be able to use a copy of this return to satisfy state reporting requirements.

OMB No 1545-0052

2012

Open to public inspection

For calendar year 2012 or tax year beginning

, and ending

Name of foundation NICKEL PRODUCERS ENVIRONMENTAL RESEARCH ASSOCIATION, INC.		A Employer identification number 13-3070077
Number and street (or P.O. box number if mail is not delivered to street address) 2525 MERIDIAN PARKWAY	Room/suite 240	B Telephone number 919-595-1950
City or town, state, and ZIP code DURHAM, NC 27713		C If exemption application is pending, check here <input type="checkbox"/>
G Check all that apply: <input type="checkbox"/> Initial return <input type="checkbox"/> Final return <input type="checkbox"/> Address change <input type="checkbox"/> Initial return of a former public charity <input type="checkbox"/> Amended return <input type="checkbox"/> Name change		D 1. Foreign organizations, check here <input type="checkbox"/> 2. Foreign organizations meeting the 85% test, check here and attach computation <input type="checkbox"/>
H Check type of organization: <input checked="" type="checkbox"/> Section 501(c)(3) exempt private foundation <input type="checkbox"/> Section 4947(a)(1) nonexempt charitable trust <input type="checkbox"/> Other taxable private foundation		E If private foundation status was terminated under section 507(b)(1)(A), check here <input type="checkbox"/>
I Fair market value of all assets at end of year (from Part II, col (c), line 16) \$ 806,659. (Part I, column (d) must be on cash basis)		F If the foundation is in a 60-month termination under section 507(b)(1)(B), check here <input type="checkbox"/>
J Accounting method: <input type="checkbox"/> Cash <input checked="" type="checkbox"/> Accrual <input type="checkbox"/> Other (specify) _____		

Part I Analysis of Revenue and Expenses (The total of amounts in columns (b), (c), and (d) may not necessarily equal the amounts in column (a))		(a) Revenue and expenses per books	(b) Net investment income	(c) Adjusted net income	(d) Disbursements for charitable purposes (cash basis only)
1 Contributions, gifts, grants, etc., received		3,138,859.		N/A	
2 Check <input type="checkbox"/> if the foundation is not required to attach Sch. B					
3 Interest on savings and temporary cash investments		77.	77.		STATEMENT 1
4 Dividends and interest from securities					
5a Gross rents					
b Net rental income or (loss)					
6a Net gain or (loss) from sale of assets not on line 10					
b Gross sales price for all assets on line 6a					
7 Capital gain net income (from Part IV, line 2)			0.		
8 Net short-term capital gain					
9 Income modifications					
10a Gross sales less returns and allowances					
b Less Cost of goods sold					
c Gross profit or (loss)					
11 Other income					
12 Total Add lines 1 through 11		3,138,936.	77.		
13 Compensation of officers, directors, trustees, etc		318,558.	0.		0.
14 Other employee salaries and wages		563,388.	0.		0.
15 Pension plans, employee benefits		427,339.	0.		0.
16a Legal fees					
b Accounting fees STMT 2		11,330.	0.		0.
c Other professional fees STMT 3		49,151.	0.		0.
17 Interest					
18 Taxes					
19 Depreciation and depletion		33,552.	0.		
20 Occupancy		69,706.	0.		0.
21 Travel, conferences, and meetings		235,344.	0.		0.
22 Printing and publications		1,684.	0.		0.
23 Other expenses STMT 4		191,133.	307.		0.
24 Total Operating and administrative expenses. Add lines 19 through 23		1,901,185.	307.		0.
25 Contributions, gifts, grants paid		1,837,489.			1,156,182.
26 Total expenses and disbursements Add lines 24 and 25		3,738,674.	307.		1,156,182.
27 Subtract line 26 from line 12:					
a Excess of revenue over expenses and disbursements		<599,738.>			
b Net investment income (if negative, enter -0-)			0.		
c Adjusted net income (if negative, enter -0-)				N/A	

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12-05-12

LHA For Paperwork Reduction Act Notice, see instructions.

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**NICKEL PRODUCERS ENVIRONMENTAL
RESEARCH ASSOCIATION, INC.**

Part II Balance Sheets		Attached schedules and amounts in the description column should be for end-of-year amounts only		
		Beginning of year (a) Book Value	End of year (b) Book Value (c) Fair Market Value	
Assets	1 Cash - non-interest-bearing			
	2 Savings and temporary cash investments	433,056.	628,523.	628,523.
	3 Accounts receivable ▶			
	Less: allowance for doubtful accounts ▶	175,866.		
	4 Pledges receivable ▶			
	Less: allowance for doubtful accounts ▶			
	5 Grants receivable			
	6 Receivables due from officers, directors, trustees, and other disqualified persons			
	7 Other notes and loans receivable ▶			
	Less: allowance for doubtful accounts ▶			
	8 Inventories for sale or use			
	9 Prepaid expenses and deferred charges	16,747.	15,852.	
	10a Investments - U.S. and state government obligations			
	b Investments - corporate stock			
	c Investments - corporate bonds			
Liabilities	11 Investments - land, buildings, and equipment basis ▶			
	Less accumulated depreciation ▶			
	12 Investments - mortgage loans			
	13 Investments - other			
	14 Land, buildings, and equipment: basis ▶ 178,136.			
	Less accumulated depreciation STMT 5 ▶ 97,136.	92,046.	81,000.	178,136.
	15 Other assets (describe ▶ SECURITY DEPOSIT)	12,668.	12,668.	0.
	16 Total assets (to be completed by all filers)	730,383.	738,043.	806,659.
	17 Accounts payable and accrued expenses	71,227.	10,030.	
	18 Grants payable	861,842.	1,507,453.	
Net Assets or Fund Balances	19 Deferred revenue			
	20 Loans from officers, directors, trustees, and other disqualified persons			
	21 Mortgages and other notes payable			
	22 Other liabilities (describe ▶ STATEMENT 6)	128,817.	151,801.	
	23 Total liabilities (add lines 17 through 22)	1,061,886.	1,669,284.	
Net Assets or Fund Balances	Foundations that follow SFAS 117, check here ▶ <input checked="" type="checkbox"/> and complete lines 24 through 26 and lines 30 and 31			
	24 Unrestricted	<331,503.>	<931,241.>	
	25 Temporarily restricted			
	26 Permanently restricted			
	Foundations that do not follow SFAS 117, check here ▶ <input type="checkbox"/> and complete lines 27 through 31.			
	27 Capital stock, trust principal, or current funds			
	28 Paid-in or capital surplus, or land, bldg., and equipment fund			
Net Assets or Fund Balances	29 Retained earnings, accumulated income, endowment, or other funds			
	30 Total net assets or fund balances	<331,503.>	<931,241.>	
	31 Total liabilities and net assets/fund balances	730,383.	738,043.	

Part III Analysis of Changes in Net Assets or Fund Balances

1 Total net assets or fund balances at beginning of year - Part II, column (a), line 30 (must agree with end-of-year figure reported on prior year's return)	1	<331,503.>
2 Enter amount from Part I, line 27a	2	<599,738.>
3 Other increases not included in line 2 (itemize) ▶	3	0.
4 Add lines 1, 2, and 3	4	<931,241.>
5 Decreases not included in line 2 (itemize) ▶	5	0.
6 Total net assets or fund balances at end of year (line 4 minus line 5) - Part II, column (b), line 30	6	<931,241.>

Part IV Capital Gains and Losses for Tax on Investment Income

(a) List and describe the kind(s) of property sold (e.g., real estate, 2-story brick warehouse; or common stock, 200 shs. MLC Co.)	(b) How acquired P - Purchase D - Donation	(c) Date acquired (mo., day, yr.)	(d) Date sold (mo., day, yr.)
1a			
b			
c			
d			
e			

(e) Gross sales price	(f) Depreciation allowed (or allowable)	(g) Cost or other basis plus expense of sale	(h) Gain or (loss) (e) plus (f) minus (g)
a			
b			
c			
d			
e			

Complete only for assets showing gain in column (h) and owned by the foundation on 12/31/69			(l) Gains (Col. (h) gain minus col. (k), but not less than -0-) or Losses (from col. (h))
(i) F.M.V. as of 12/31/69	(j) Adjusted basis as of 12/31/69	(k) Excess of col. (i) over col. (j), if any	
a			
b			
c			
d			
e			

2 Capital gain net income or (net capital loss)	{ If gain, also enter in Part I, line 7 If (loss), enter -0- in Part I, line 7	2	
3 Net short-term capital gain or (loss) as defined in sections 1222(5) and (6): If gain, also enter in Part I, line 8, column (c). If (loss), enter -0- in Part I, line 8		3	

Part V Qualification Under Section 4940(e) for Reduced Tax on Net Investment Income

(For optional use by domestic private foundations subject to the section 4940(a) tax on net investment income.)

If section 4940(d)(2) applies, leave this part blank.

Was the foundation liable for the section 4942 tax on the distributable amount of any year in the base period? ☒ Yes ☐ No

If "Yes," the foundation does not qualify under section 4940(e). Do not complete this part.

1 Enter the appropriate amount in each column for each year; see the instructions before making any entries.

(a) Base period years Calendar year (or tax year beginning in)	(b) Adjusted qualifying distributions	(c) Net value of noncharitable-use assets	(d) Distribution ratio (col. (b) divided by col. (c))
2011			
2010			
2009			
2008			
2007			

2 Total of line 1, column (d)	2	
3 Average distribution ratio for the 5-year base period - divide the total on line 2 by 5, or by the number of years the foundation has been in existence if less than 5 years	3	
4 Enter the net value of noncharitable-use assets for 2012 from Part X, line 5	4	
5 Multiply line 4 by line 3	5	
6 Enter 1% of net investment income (1% of Part I, line 27b)	6	
7 Add lines 5 and 6	7	
8 Enter qualifying distributions from Part XII, line 4 If line 8 is equal to or greater than line 7, check the box in Part VI, line 1b, and complete that part using a 1% tax rate. See the Part VI instructions.	8	

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Part VI Excise Tax Based on Investment Income (Section 4940(a), 4940(b), 4940(e), or 4948 - see instructions)

1a Exempt operating foundations described in section 4940(d)(2), check here <input type="checkbox"/> and enter "N/A" on line 1. Date of ruling or determination letter: _____ (attach copy of letter if necessary-see instructions)			
b Domestic foundations that meet the section 4940(e) requirements in Part V, check here <input type="checkbox"/> and enter 1% of Part I, line 27b		1	0.
c All other domestic foundations enter 2% of line 27b. Exempt foreign organizations enter 4% of Part I, line 12, col. (b).			
2 Tax under section 511 (domestic section 4947(a)(1) trusts and taxable foundations only. Others enter -0-)		2	0.
3 Add lines 1 and 2		3	0.
4 Subtitle A (income) tax (domestic section 4947(a)(1) trusts and taxable foundations only. Others enter -0-)		4	0.
5 Tax based on investment income. Subtract line 4 from line 3. If zero or less, enter -0-		5	0.
6 Credits/Payments:			
a 2012 estimated tax payments and 2011 overpayment credited to 2012	6a		
b Exempt foreign organizations - tax withheld at source	6b		
c Tax paid with application for extension of time to file (Form 8868)	6c		
d Backup withholding erroneously withheld	6d		
7 Total credits and payments. Add lines 6a through 6d		7	0.
8 Enter any penalty for underpayment of estimated tax. Check here <input type="checkbox"/> if Form 2220 is attached		8	
9 Tax due. If the total of lines 5 and 8 is more than line 7, enter amount owed		9	0.
10 Overpayment. If line 7 is more than the total of lines 5 and 8, enter the amount overpaid		10	
11 Enter the amount of line 10 to be: Credited to 2013 estimated tax <input type="checkbox"/> Refunded <input type="checkbox"/>		11	

Part VII-A Statements Regarding Activities

	Yes	No
1a During the tax year, did the foundation attempt to influence any national, state, or local legislation or did it participate or intervene in any political campaign?		X
1b Did it spend more than \$100 during the year (either directly or indirectly) for political purposes (see instructions for definition)? If the answer is "Yes" to 1a or 1b, attach a detailed description of the activities and copies of any materials published or distributed by the foundation in connection with the activities.		X
1c Did the foundation file Form 1120-POL for this year?		X
d Enter the amount (if any) of tax on political expenditures (section 4955) imposed during the year: (1) On the foundation. \$ 0. (2) On foundation managers. \$ 0.		
e Enter the reimbursement (if any) paid by the foundation during the year for political expenditure tax imposed on foundation managers. \$ 0.		
2 Has the foundation engaged in any activities that have not previously been reported to the IRS? If "Yes," attach a detailed description of the activities	2	X
3 Has the foundation made any changes, not previously reported to the IRS, in its governing instrument, articles of incorporation, or bylaws, or other similar instruments? If "Yes," attach a conformed copy of the changes	3	X
4a Did the foundation have unrelated business gross income of \$1,000 or more during the year?	4a	X
b If "Yes," has it filed a tax return on Form 990-T for this year?	4b	
5 Was there a liquidation, termination, dissolution, or substantial contraction during the year? If "Yes," attach the statement required by General Instruction T.	5	X
6 Are the requirements of section 508(e) (relating to sections 4941 through 4945) satisfied either: • By language in the governing instrument, or • By state legislation that effectively amends the governing instrument so that no mandatory directions that conflict with the state law remain in the governing instrument?	6	X
7 Did the foundation have at least \$5,000 in assets at any time during the year? If "Yes," complete Part II, col. (c), and Part XV.	7	X
8a Enter the states to which the foundation reports or with which it is registered (see instructions) <u>NY</u>		
b If the answer is "Yes" to line 7, has the foundation furnished a copy of Form 990-PF to the Attorney General (or designate) of each state as required by General Instruction G? If "No," attach explanation	8b	X
9 Is the foundation claiming status as a private operating foundation within the meaning of section 4942(j)(3) or 4942(j)(5) for calendar year 2012 or the taxable year beginning in 2012 (see instructions for Part XIV)? If "Yes," complete Part XIV	9	X
10 Did any persons become substantial contributors during the tax year? If "Yes," attach a schedule listing their names and addresses	10	X

N/A

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Part VII-A Statements Regarding Activities (continued)

<p>11 At any time during the year, did the foundation, directly or indirectly, own a controlled entity within the meaning of section 512(b)(13)? If "Yes," attach schedule (see instructions)</p> <p>12 Did the foundation make a distribution to a donor advised fund over which the foundation or a disqualified person had advisory privileges? If "Yes," attach statement (see instructions)</p> <p>13 Did the foundation comply with the public inspection requirements for its annual returns and exemption application? Website address ► <u>WWW.NIPERA.ORG</u></p> <p>14 The books are in care of ► <u>GERALD M. SCHUETZ</u> Telephone no. ► <u>919-595-1946</u> Located at ► <u>2525 MERIDIAN PARKWAY, STE 240, DURHAM, NC</u> ZIP+4 ► <u>27713</u></p> <p>15 Section 4947(a)(1) nonexempt charitable trusts filing Form 990-PF in lieu of Form 1041 - Check here and enter the amount of tax-exempt interest received or accrued during the year ► <u>15</u> <u>N/A</u></p> <p>16 At any time during calendar year 2012, did the foundation have an interest in or a signature or other authority over a bank, securities, or other financial account in a foreign country? See the instructions for exceptions and filing requirements for Form TD F 90-22.1. If "Yes," enter the name of the foreign country ►</p>	<table border="1"> <tr><td>11</td><td></td><td>X</td></tr> <tr><td>12</td><td></td><td>X</td></tr> <tr><td>13</td><td>X</td><td></td></tr> <tr><td>16</td><td></td><td>X</td></tr> </table>	11		X	12		X	13	X		16		X
11		X											
12		X											
13	X												
16		X											

Part VII-B Statements Regarding Activities for Which Form 4720 May Be Required

File Form 4720 if any item is checked in the "Yes" column, unless an exception applies.

		Yes	No																
<p>1a During the year did the foundation (either directly or indirectly):</p> <p>(1) Engage in the sale or exchange, or leasing of property with a disqualified person? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>(2) Borrow money from, lend money to, or otherwise extend credit to (or accept it from) a disqualified person? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>(3) Furnish goods, services, or facilities to (or accept them from) a disqualified person? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>(4) Pay compensation to, or pay or reimburse the expenses of, a disqualified person? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>(5) Transfer any income or assets to a disqualified person (or make any of either available for the benefit or use of a disqualified person)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>(6) Agree to pay money or property to a government official? (Exception. Check "No" if the foundation agreed to make a grant to or to employ the official for a period after termination of government service, if terminating within 90 days.) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>b If any answer is "Yes" to 1a(1)-(6), did any of the acts fail to qualify under the exceptions described in Regulations section 53.4941(d)-3 or in a current notice regarding disaster assistance (see instructions)? Organizations relying on a current notice regarding disaster assistance check here N/A</p> <p>c Did the foundation engage in a prior year in any of the acts described in 1a, other than excepted acts, that were not corrected before the first day of the tax year beginning in 2012? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>2 Taxes on failure to distribute income (section 4942) (does not apply for years the foundation was a private operating foundation defined in section 4942(j)(3) or 4942(j)(5)):</p> <p>a At the end of tax year 2012, did the foundation have any undistributed income (lines 6d and 6e, Part XIII) for tax year(s) beginning before 2012? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If "Yes," list the years ►</p> <p>b Are there any years listed in 2a for which the foundation is not applying the provisions of section 4942(a)(2) (relating to incorrect valuation of assets) to the year's undistributed income? (If applying section 4942(a)(2) to all years listed, answer "No" and attach statement - see instructions.) N/A</p> <p>c If the provisions of section 4942(a)(2) are being applied to any of the years listed in 2a, list the years here. ►</p> <p>3a Did the foundation hold more than a 2% direct or indirect interest in any business enterprise at any time during the year? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>b If "Yes," did it have excess business holdings in 2012 as a result of (1) any purchase by the foundation or disqualified persons after May 26, 1969; (2) the lapse of the 5-year period (or longer period approved by the Commissioner under section 4943(c)(7)) to dispose of holdings acquired by gift or bequest; or (3) the lapse of the 10-, 15-, or 20-year first phase holding period? (Use Schedule C, Form 4720, to determine if the foundation had excess business holdings in 2012) N/A</p> <p>4a Did the foundation invest during the year any amount in a manner that would jeopardize its charitable purposes?</p> <p>b Did the foundation make any investment in a prior year (but after December 31, 1969) that could jeopardize its charitable purpose that had not been removed from jeopardy before the first day of the tax year beginning in 2012?</p>	<table border="1"> <tr><td>1b</td><td></td><td></td></tr> <tr><td>1c</td><td></td><td>X</td></tr> <tr><td>2b</td><td></td><td></td></tr> <tr><td>3b</td><td></td><td></td></tr> <tr><td>4a</td><td></td><td>X</td></tr> <tr><td>4b</td><td></td><td>X</td></tr> </table>	1b			1c		X	2b			3b			4a		X	4b		X
1b																			
1c		X																	
2b																			
3b																			
4a		X																	
4b		X																	

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RESEARCH ASSOCIATION, INC.

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Part VII-B Statements Regarding Activities for Which Form 4720 May Be Required (continued)

5a During the year did the foundation pay or incur any amount to:

(1) Carry on propaganda, or otherwise attempt to influence legislation (section 4945(e))?

☐ Yes ☒ No

(2) Influence the outcome of any specific public election (see section 4955); or to carry on, directly or indirectly, any voter registration drive?

☐ Yes ☒ No

(3) Provide a grant to an individual for travel, study, or other similar purposes?

☐ Yes ☒ No

(4) Provide a grant to an organization other than a charitable, etc., organization described in section 509(a)(1), (2), or (3), or section 4940(d)(2)?

☒ Yes ☐ No

(5) Provide for any purpose other than religious, charitable, scientific, literary, or educational purposes, or for the prevention of cruelty to children or animals?

☐ Yes ☒ No

b If any answer is "Yes" to 5a(1)-(5), did any of the transactions fail to qualify under the exceptions described in Regulations section 53.4945 or in a current notice regarding disaster assistance (see instructions)?

Organizations relying on a current notice regarding disaster assistance check here

☐

5b

X

c If the answer is "Yes" to question 5a(4), does the foundation claim exemption from the tax because it maintained expenditure responsibility for the grant?

SEE STATEMENT 8

☒ Yes ☐ No

If "Yes," attach the statement required by Regulations section 53.4945-5(d)

6a Did the foundation, during the year, receive any funds, directly or indirectly, to pay premiums on a personal benefit contract?

☐ Yes ☒ No

6b

X

b Did the foundation, during the year, pay premiums, directly or indirectly, on a personal benefit contract?

If "Yes" to 6b, file Form 8870

7a At any time during the tax year, was the foundation a party to a prohibited tax shelter transaction?

☐ Yes ☒ No

b If "Yes," did the foundation receive any proceeds or have any net income attributable to the transaction?

N/A

7b

Part VIII Information About Officers, Directors, Trustees, Foundation Managers, Highly Paid Employees, and Contractors

1 List all officers, directors, trustees, foundation managers and their compensation.

(a) Name and address	(b) Title, and average hours per week devoted to position	(c) Compensation (If not paid, enter -0-)	(d) Contributions to employee benefit plans and deferred compensation	(e) Expense account, other allowances
SEE STATEMENT 7		318,558.	37,324.	0.

2 Compensation of five highest-paid employees (other than those included on line 1). If none, enter "NONE."

(a) Name and address of each employee paid more than \$50,000	(b) Title, and average hours per week devoted to position	(c) Compensation	(d) Contributions to employee benefit plans and deferred compensation	(e) Expense account, other allowances
ADRIANA R OLLER - 2525 MERIDIAN PARKWAY, SUITE 240, DURHAM, NC 27713	40.00	211,732.	31,073.	0.
CHRISTIAN E SCHLEKAT - 2525 MERIDIAN PARKWAY, SUITE 240, DURHAM, NC 27713	40.00	178,706.	24,467.	0.
KATHERINE E HEIM - 2525 MERIDIAN PARKWAY, SUITE 240, DURHAM, NC 27713	40.00	117,715.	22,984.	0.
EMILY R GARMAN - 2525 MERIDIAN PARKWAY, SUITE 240, DURHAM, NC 27713	40.00	101,391.	16,930.	0.
RAYETTA G HENDERSON - 2525 MERIDIAN PARKWAY, SUITE 240, DURHAM, NC 27713	40.00	88,213.	16,367.	0.
Total number of other employees paid over \$50,000				0

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Part VIII Information About Officers, Directors, Trustees, Foundation Managers, Highly Paid Employees, and Contractors (continued)

3 Five highest-paid independent contractors for professional services. If none, enter "NONE."

(a) Name and address of each person paid more than \$50,000	(b) Type of service	(c) Compensation
HAMNER INSTITUTES FOR HEALTH SCIENCE - 6 DAVIS DRIVE, RESEARCH TRIANGLE PARK, NC 27709	RESEARCH	143,145.
INTERNATIONAL LEAD ZINC RESEARCH ORG, INC 1822 NC HIGHWAY 54 EAST, DURHAM, NC 27713	RESEARCH	140,424.
WIL RESEARCH LABORATORIES, LLC 1407 GEORGE ROAD, ASHLAND, OH 44805	RESEARCH	134,250.
SOUTHERN RESEARCH INSTITUTE 2000 NINTH AVENUE SOUTH, BIRMINGHAM, AL 35205	RESEARCH	125,900.
ENVIRON INTERNATIONAL CORP PO BOX 8500-10980, PHILADELPHIA, PA 19178	CONSULTING	68,112.
Total number of others receiving over \$50,000 for professional services		0

Part IX-A Summary of Direct Charitable Activities

List the foundation's four largest direct charitable activities during the tax year. Include relevant statistical information such as the number of organizations and other beneficiaries served, conferences convened, research papers produced, etc.	Expenses
1 GRANT 2012-28 ONE-GENERATION STUDY - STATEMENT 12	116,500.
2 GRANT 2011-04 MODE OF ACTION NI STUDIES - STATEMENT 13	143,145.
3 GRANT 2012-22 4-WEEK NOSE INHALATION STUDY - STATEMENT 14	95,000.
4 GRANT 2011-AD ETAP 2011 - STATEMENT 15	70,767.

Part IX-B Summary of Program-Related Investments

Describe the two largest program-related investments made by the foundation during the tax year on lines 1 and 2.	Amount
1 N/A	
2	
All other program-related investments. See instructions.	
3	
Total. Add lines 1 through 3	0.

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Part X Minimum Investment Return (All domestic foundations must complete this part. Foreign foundations, see instructions.)

1	Fair market value of assets not used (or held for use) directly in carrying out charitable, etc., purposes:		
a	Average monthly fair market value of securities	1a	0.
b	Average of monthly cash balances	1b	530,790.
c	Fair market value of all other assets	1c	
d	Total (add lines 1a, b, and c)	1d	530,790.
e	Reduction claimed for blockage or other factors reported on lines 1a and 1c (attach detailed explanation)	1e	0.
2	Acquisition indebtedness applicable to line 1 assets	2	0.
3	Subtract line 2 from line 1d	3	530,790.
4	Cash deemed held for charitable activities. Enter 1 1/2% of line 3 (for greater amount, see instructions)	4	7,962.
5	Net value of noncharitable-use assets Subtract line 4 from line 3. Enter here and on Part V, line 4	5	522,828.
6	Minimum investment return. Enter 5% of line 5	6	26,141.

Part XI Distributable Amount (see instructions) (Section 4942(j)(3) and (j)(5) private operating foundations and certain foreign organizations check here ☐ and do not complete this part.)

1	Minimum investment return from Part X, line 6	1	26,141.
2a	Tax on investment income for 2012 from Part VI, line 5	2a	
b	Income tax for 2012. (This does not include the tax from Part VI.)	2b	
c	Add lines 2a and 2b	2c	0.
3	Distributable amount before adjustments. Subtract line 2c from line 1	3	26,141.
4	Recoveries of amounts treated as qualifying distributions	4	0.
5	Add lines 3 and 4	5	26,141.
6	Deduction from distributable amount (see instructions)	6	0.
7	Distributable amount as adjusted. Subtract line 6 from line 5. Enter here and on Part XIII, line 1	7	26,141.

Part XII Qualifying Distributions (see instructions)

1	Amounts paid (including administrative expenses) to accomplish charitable, etc., purposes:		
a	Expenses, contributions, gifts, etc. - total from Part I, column (d), line 26	1a	1,156,182.
b	Program-related investments - total from Part IX-B	1b	0.
2	Amounts paid to acquire assets used (or held for use) directly in carrying out charitable, etc., purposes	2	
3	Amounts set aside for specific charitable projects that satisfy the:		
a	Suitability test (prior IRS approval required)	3a	
b	Cash distribution test (attach the required schedule)	3b	
4	Qualifying distributions. Add lines 1a through 3b. Enter here and on Part V, line 8, and Part XIII, line 4	4	1,156,182.
5	Foundations that qualify under section 4940(e) for the reduced rate of tax on net investment income. Enter 1% of Part I, line 27b	5	0.
6	Adjusted qualifying distributions. Subtract line 5 from line 4	6	1,156,182.

Note The amount on line 6 will be used in Part V, column (b), in subsequent years when calculating whether the foundation qualifies for the section 4940(e) reduction of tax in those years.

**NICKEL PRODUCERS ENVIRONMENTAL
RESEARCH ASSOCIATION, INC.**
Part XIII Undistributed Income (see instructions)

	(a) Corpus	(b) Years prior to 2011	(c) 2011	(d) 2012
1 Distributable amount for 2012 from Part XI, line 7				26,141.
2 Undistributed income, if any, as of the end of 2012				
a Enter amount for 2011 only			0.	
b Total for prior years:		0.		
3 Excess distributions carryover, if any, to 2012:				
a From 2007	1,100,297.			
b From 2008	847,443.			
c From 2009	2,244,363.			
d From 2010	1,811,403.			
e From 2011	1,357,384.			
f Total of lines 3a through e	7,360,890.			
4 Qualifying distributions for 2012 from Part XII, line 4: ► \$	1,156,182.			
a Applied to 2011, but not more than line 2a			0.	
b Applied to undistributed income of prior years (Election required - see instructions)		0.		
c Treated as distributions out of corpus (Election required - see instructions)	0.			
d Applied to 2012 distributable amount				26,141.
e Remaining amount distributed out of corpus	1,130,041.			
5 Excess distributions carryover applied to 2012 (If an amount appears in column (d), the same amount must be shown in column (a))	0.			0.
6 Enter the net total of each column as indicated below:				
a Corpus Add lines 3f, 4c, and 4e Subtract line 5	8,490,931.			
b Prior years' undistributed income. Subtract line 4b from line 2b		0.		
c Enter the amount of prior years' undistributed income for which a notice of deficiency has been issued, or on which the section 4942(a) tax has been previously assessed		0.		
d Subtract line 6c from line 6b. Taxable amount - see instructions		0.		
e Undistributed income for 2011. Subtract line 4a from line 2a. Taxable amount - see instr.			0.	
f Undistributed income for 2012. Subtract lines 4d and 5 from line 1. This amount must be distributed in 2013				0.
7 Amounts treated as distributions out of corpus to satisfy requirements imposed by section 170(b)(1)(F) or 4942(g)(3)	0.			
8 Excess distributions carryover from 2007 not applied on line 5 or line 7	1,100,297.			
9 Excess distributions carryover to 2013. Subtract lines 7 and 8 from line 6a	7,390,634.			
10 Analysis of line 9:				
a Excess from 2008	847,443.			
b Excess from 2009	2,244,363.			
c Excess from 2010	1,811,403.			
d Excess from 2011	1,357,384.			
e Excess from 2012	1,130,041.			

**NICKEL PRODUCERS ENVIRONMENTAL
RESEARCH ASSOCIATION, INC.**

Form 990-PF (2012)

13-3070077 Page 10

Part XIV Private Operating Foundations (see instructions and Part VII-A, question 9)

N/A

1 a If the foundation has received a ruling or determination letter that it is a private operating foundation, and the ruling is effective for 2012, enter the date of the ruling ▶

b Check box to indicate whether the foundation is a private operating foundation described in section ☐ 4942(j)(3) or ☐ 4942(j)(5)

	Tax year	Prior 3 years			(e) Total
	(a) 2012	(b) 2011	(c) 2010	(d) 2009	
2 a Enter the lesser of the adjusted net income from Part I or the minimum investment return from Part X for each year listed					
b 85% of line 2a					
c Qualifying distributions from Part XII, line 4 for each year listed					
d Amounts included in line 2c not used directly for active conduct of exempt activities					
e Qualifying distributions made directly for active conduct of exempt activities. Subtract line 2d from line 2c					
3 Complete 3a, b, or c for the alternative test relied upon:					
a "Assets" alternative test - enter:					
(1) Value of all assets					
(2) Value of assets qualifying under section 4942(j)(3)(B)(i)					
b "Endowment" alternative test - enter 2/3 of minimum investment return shown in Part X, line 6 for each year listed					
c "Support" alternative test - enter:					
(1) Total support other than gross investment income (interest, dividends, rents, payments on securities loans (section 512(a)(5)), or royalties)					
(2) Support from general public and 5 or more exempt organizations as provided in section 4942(j)(3)(B)(iii)					
(3) Largest amount of support from an exempt organization					
(4) Gross investment income					

Part XV Supplementary Information (Complete this part only if the foundation had \$5,000 or more in assets at any time during the year-see instructions.)

1 Information Regarding Foundation Managers:

a List any managers of the foundation who have contributed more than 2% of the total contributions received by the foundation before the close of any tax year (but only if they have contributed more than \$5,000). (See section 507(d)(2).)

NONE

b List any managers of the foundation who own 10% or more of the stock of a corporation (or an equally large portion of the ownership of a partnership or other entity) of which the foundation has a 10% or greater interest.

NONE

2 Information Regarding Contribution, Grant, Gift, Loan, Scholarship, etc., Programs:

Check here ☐ if the foundation only makes contributions to preselected charitable organizations and does not accept unsolicited requests for funds. If the foundation makes gifts, grants, etc. (see instructions) to individuals or organizations under other conditions, complete items 2a, b, c, and d.

a The name, address, and telephone number or e-mail of the person to whom applications should be addressed:

SEE STATEMENT 9

b The form in which applications should be submitted and information and materials they should include:

c Any submission deadlines:

d Any restrictions or limitations on awards, such as by geographical areas, charitable fields, kinds of institutions, or other factors:

3 Grants and Contributions Paid During the Year or Approved for Future Payment

Part XVI-A Analysis of Income-Producing Activities

Enter gross amounts unless otherwise indicated.

Enter gross amounts unless otherwise indicated.		Unrelated business income		Excluded by section 512, 513, or 514		(e) Related or exempt function income
	(a) Business code	(b) Amount	(c) Exclu- sion code	(d) Amount		
1 Program service revenue:						
a _____						
b _____						
c _____						
d _____						
e _____						
f _____						
g Fees and contracts from government agencies						
2 Membership dues and assessments						
3 Interest on savings and temporary cash investments			14	77.		
4 Dividends and interest from securities						
5 Net rental income or (loss) from real estate:						
a Debt-financed property						
b Not debt-financed property						
6 Net rental income or (loss) from personal property						
7 Other investment income						
8 Gain or (loss) from sales of assets other than inventory						
9 Net income or (loss) from special events						
10 Gross profit or (loss) from sales of inventory						
11 Other revenue:						
a _____						
b _____						
c _____						
d _____						
e _____						
12 Subtotal. Add columns (b), (d), and (e)		0.		77.		0.
13 Total Add line 12, columns (b), (d), and (e)					13	77.

(See worksheet in line 13 instructions to verify calculations.)

Part XVI-B Relationship of Activities to the Accomplishment of Exempt Purposes

[illegible]

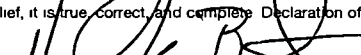
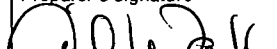
Part XVII Information Regarding Transfers To and Transactions and Relationships With Noncharitable Exempt Organizations

- | 1 | Did the organization directly or indirectly engage in any of the following with any other organization described in section 501(c) of the Code (other than section 501(c)(3) organizations) or in section 527, relating to political organizations? | Yes | No |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----|
| | | | |
| a | Transfers from the reporting foundation to a noncharitable exempt organization of: | | |
| | (1) Cash | 1a(1) | X |
| | (2) Other assets | 1a(2) | X |
| b | Other transactions: | | |
| | (1) Sales of assets to a noncharitable exempt organization | 1b(1) | X |
| | (2) Purchases of assets from a noncharitable exempt organization | 1b(2) | X |
| | (3) Rental of facilities, equipment, or other assets | 1b(3) | X |
| | (4) Reimbursement arrangements | 1b(4) | X |
| | (5) Loans or loan guarantees | 1b(5) | X |
| | (6) Performance of services or membership or fundraising solicitations | 1b(6) | X |
| c | Sharing of facilities, equipment, mailing lists, other assets, or paid employees | 1c | X |
| d | If the answer to any of the above is "Yes," complete the following schedule. Column (b) should always show the fair market value of the goods, other assets, or services given by the reporting foundation. If the foundation received less than fair market value in any transaction or sharing arrangement, show in column (d) the value of the goods, other assets, or services received. | | |

[illegible]

- 2a** Is the foundation directly or indirectly affiliated with, or related to, one or more tax-exempt organizations described in section 501(c) of the Code (other than section 501(c)(3)) or in section 527? ☐ Yes ☒ No
- b** If "Yes," complete the following schedule.

(a) Name of organization	(b) Type of organization	(c) Description of relationship
N/A		

Sign Here  Signature of officer or trustee	Under penalties of perjury, I declare that I have examined this return, including accompanying schedules and statements, and to the best of my knowledge and belief, it is true, correct, and complete. Declaration of preparer (other than taxpayer) is based on all information of which preparer has any knowledge.			May the IRS discuss this return with the preparer shown below (see instr.)? <input checked="checked" type="checkbox"/> Yes <input type="checkbox"/> No	
	Date 8/12/13	EXECUTIVE DIRECTOR Title	Date		
Paid Preparer Use Only	Print/Type preparer's name APRIL WALKER	Preparer's signature 	Date 8/8/13	Check <input type="checkbox"/> if self-employed	PTIN P00829419
	Firm's name ▶ BLACKMAN & SLOOP, CPAS, P.A.			Firm's EIN ▶ 56-1304727	
	Firm's address ▶ 1414 RALEIGH RD, SUITE 300 CHAPEL HILL, NC 27517			Phone no. (919) 942-8700	

Form **990-PF** (2012)

Schedule B(Form 990, 990-EZ,
or 990-PF)Department of the Treasury
Internal Revenue Service**Schedule of Contributors**

▶ Attach to Form 990, Form 990-EZ, or Form 990-PF.

OMB No 1545-0047

2012

Name of the organization

NICKEL PRODUCERS ENVIRONMENTAL
RESEARCH ASSOCIATION, INC.

Employer identification number

13-3070077

Organization type (check one)

Filers of:

Section:

Form 990 or 990-EZ

☐ 501(c)() (enter number) organization☐ 4947(a)(1) nonexempt charitable trust **not** treated as a private foundation☐ 527 political organization

Form 990-PF

☒ 501(c)(3) exempt private foundation☐ 4947(a)(1) nonexempt charitable trust treated as a private foundation☐ 501(c)(3) taxable private foundationCheck if your organization is covered by the **General Rule** or a **Special Rule**.**Note.** Only a section 501(c)(7), (8), or (10) organization can check boxes for both the General Rule and a Special Rule. See instructions.**General Rule**

- ☒ For an organization filing Form 990, 990-EZ, or 990-PF that received, during the year, \$5,000 or more (in money or property) from any one contributor. Complete Parts I and II.

Special Rules

- ☐ For a section 501(c)(3) organization filing Form 990 or 990-EZ that met the 33 1/3% support test of the regulations under sections 509(a)(1) and 170(b)(1)(A)(vi) and received from any one contributor, during the year, a contribution of the greater of (1) \$5,000 or (2) 2% of the amount on (i) Form 990, Part VIII, line 1h, or (ii) Form 990-EZ, line 1. Complete Parts I and II.
- ☐ For a section 501(c)(7), (8), or (10) organization filing Form 990 or 990-EZ that received from any one contributor, during the year, total contributions of more than \$1,000 for use *exclusively* for religious, charitable, scientific, literary, or educational purposes, or the prevention of cruelty to children or animals. Complete Parts I, II, and III.
- ☐ For a section 501(c)(7), (8), or (10) organization filing Form 990 or 990-EZ that received from any one contributor, during the year, contributions for use *exclusively* for religious, charitable, etc., purposes, but these contributions did not total to more than \$1,000. If this box is checked, enter here the total contributions that were received during the year for an *exclusively* religious, charitable, etc., purpose. Do not complete any of the parts unless the **General Rule** applies to this organization because it received nonexclusively religious, charitable, etc., contributions of \$5,000 or more during the year. ▶ \$ _____

Caution. An organization that is not covered by the General Rule and/or the Special Rules does not file Schedule B (Form 990, 990-EZ, or 990-PF), but it **must** answer "No" on Part IV, line 2, of its Form 990, or check the box on line H of its Form 990-EZ or on Part I, line 2 of its Form 990-PF, to certify that it does not meet the filing requirements of Schedule B (Form 990, 990-EZ, or 990-PF).

LHA For Paperwork Reduction Act Notice, see the Instructions for Form 990, 990-EZ, or 990-PF. Schedule B (Form 990, 990-EZ, or 990-PF) (2012)

Name of organization

NICKEL PRODUCERS ENVIRONMENTAL
RESEARCH ASSOCIATION, INC.

Employer identification number

13-3070077

Part I Contributors (see instructions) Use duplicate copies of Part I if additional space is needed

(a) No.	(b) Name, address, and ZIP + 4	(c) Total contributions	(d) Type of contribution
1	NICKEL INSTITUTE BROOKFIELD PLACE 161 BAY STREET, SUITE 2700 TORONTO, ONTARIO, CANADA M5J 2S1	\$ 3,138,859.	Person <input checked="" type="checkbox"/> Payroll <input type="checkbox"/> Noncash <input type="checkbox"/> (Complete Part II if there is a noncash contribution)
			Person <input type="checkbox"/> Payroll <input type="checkbox"/> Noncash <input type="checkbox"/> (Complete Part II if there is a noncash contribution)
			Person <input type="checkbox"/> Payroll <input type="checkbox"/> Noncash <input type="checkbox"/> (Complete Part II if there is a noncash contribution)
			Person <input type="checkbox"/> Payroll <input type="checkbox"/> Noncash <input type="checkbox"/> (Complete Part II if there is a noncash contribution)
			Person <input type="checkbox"/> Payroll <input type="checkbox"/> Noncash <input type="checkbox"/> (Complete Part II if there is a noncash contribution)
			Person <input type="checkbox"/> Payroll <input type="checkbox"/> Noncash <input type="checkbox"/> (Complete Part II if there is a noncash contribution)
			Person <input type="checkbox"/> Payroll <input type="checkbox"/> Noncash <input type="checkbox"/> (Complete Part II if there is a noncash contribution)

Name of organization

**NICKEL PRODUCERS ENVIRONMENTAL
RESEARCH ASSOCIATION, INC.**

Employer identification number

13-3070077**Part II Noncash Property** (see instructions). Use duplicate copies of Part II if additional space is needed

(a) No. from Part I	(b) Description of noncash property given	(c) FMV (or estimate) (see instructions)	(d) Date received
		\$	
		\$	
		\$	
		\$	
		\$	
		\$	
		\$	
		\$	
		\$	
		\$	

Name of organization

Employer identification number

**NICKEL PRODUCERS ENVIRONMENTAL
RESEARCH ASSOCIATION, INC.**

13-3070077

Part III Exclusively religious, charitable, etc., individual contributions to section 501(c)(7), (8), or (10) organizations that total more than \$1,000 for the year. Complete columns (a) through (e) and the following line entry. For organizations completing Part III, enter the total of exclusively religious, charitable, etc., contributions of \$1,000 or less for the year. (Enter this information once) ▶ \$

Use duplicate copies of Part III if additional space is needed

(a) No. from Part I	(b) Purpose of gift	(c) Use of gift	(d) Description of how gift is held
	(e) Transfer of gift		
	Transferee's name, address, and ZIP + 4		Relationship of transferor to transferee
	(e) Transfer of gift		
	Transferee's name, address, and ZIP + 4		Relationship of transferor to transferee
	(e) Transfer of gift		
	Transferee's name, address, and ZIP + 4		Relationship of transferor to transferee
	(e) Transfer of gift		
	Transferee's name, address, and ZIP + 4		Relationship of transferor to transferee
	(e) Transfer of gift		
	Transferee's name, address, and ZIP + 4		Relationship of transferor to transferee

FORM 990-PF INTEREST ON SAVINGS AND TEMPORARY CASH INVESTMENTS STATEMENT 1

SOURCE	AMOUNT
INTEREST INCOME	77.
TOTAL TO FORM 990-PF, PART I, LINE 3, COLUMN A	77.

FORM 990-PF ACCOUNTING FEES STATEMENT 2

DESCRIPTION	(A) EXPENSES PER BOOKS	(B) NET INVEST- MENT INCOME	(C) ADJUSTED NET INCOME	(D) CHARITABLE PURPOSES
AUDITING & TAX PREPARATION	11,330.	0.		0.
TO FORM 990-PF, PG 1, LN 16B	11,330.	0.		0.

FORM 990-PF OTHER PROFESSIONAL FEES STATEMENT 3

DESCRIPTION	(A) EXPENSES PER BOOKS	(B) NET INVEST- MENT INCOME	(C) ADJUSTED NET INCOME	(D) CHARITABLE PURPOSES
IT CONSULTING FEES	15,725.	0.		0.
OTHER	33,426.	0.		0.
TO FORM 990-PF, PG 1, LN 16C	49,151.	0.		0.

FORM 990-PF OTHER EXPENSES STATEMENT 4

DESCRIPTION	(A) EXPENSES PER BOOKS	(B) NET INVEST- MENT INCOME	(C) ADJUSTED NET INCOME	(D) CHARITABLE PURPOSES
MEETINGS	3,882.	0.		0.
DISCRETIONARY AWARD	120,915.	0.		0.
COMMUNICATION PROJECT COSTS	16,196.	0.		0.
MISCELLANEOUS	307.	307.		0.
DUES & FEES	6,987.	0.		0.
IT EXPENSES	42,846.	0.		0.
TO FORM 990-PF, PG 1, LN 23	191,133.	307.		0.

FORM 990-PF DEPRECIATION OF ASSETS NOT HELD FOR INVESTMENT STATEMENT 5

DESCRIPTION	COST OR OTHER BASIS	ACCUMULATED DEPRECIATION	BOOK VALUE	FAIR MARKET VALUE
COMPUTER EQUIPMENT	127,765.	0.	127,765.	127,765.
FURNITURE & FIXTURES	50,371.	0.	50,371.	50,371.
TO 990-PF, PART II, LN 14	178,136.	0.	178,136.	178,136.

FORM 990-PF OTHER LIABILITIES STATEMENT 6

DESCRIPTION	BOY AMOUNT	EOY AMOUNT
PAYROLL LIABILITIES	122,583.	130,017.
DEFERRED RENT	6,234.	21,784.
TOTAL TO FORM 990-PF, PART II, LINE 22	128,817.	151,801.

FORM 990-PF PART VIII - LIST OF OFFICERS, DIRECTORS STATEMENT 7
 TRUSTEES AND FOUNDATION MANAGERS

NAME AND ADDRESS	TITLE AND AVRG HRS/WK	COMPEN- SATION	EMPLOYEE BEN PLAN CONTRIB	EXPENSE ACCOUNT
HUDSON BATES 2525 MERIDIAN PARKWAY, STE 240 DURHAM, NC 27713	EXECUTIVE DIRECTOR 40.00	296,262.	32,268.	0.
JOE CATALANO 2525 MERIDIAN PARKWAY, STE 240 DURHAM, NC 27713	TREASURER 1.25	0.	0.	0.
DAVID BUTLER 2525 MERIDIAN PARKWAY, STE 240 DURHAM, NC 27713	SECRETARY 1.25	0.	0.	0.
KEVIN BRADLEY 2525 MERIDIAN PARKWAY, STE 240 DURHAM, NC 27713	CHAIRMAN 1.25	0.	0.	0.
GERALD SCHUETZ, CPA, CGMA 2525 MERIDIAN PARKWAY, STE 240 DURHAM, NC 27713	CHIEF FINANCIAL OFFICER 40.00	22,296.	5,056.	0.
TOTALS INCLUDED ON 990-PF, PAGE 6, PART VIII		318,558.	37,324.	0.

FORM 990-PF

EXPENDITURE RESPONSIBILITY STATEMENT
PART VII-B, LINE 5C

STATEMENT 8

GRANTEE'S NAME

SEE STATEMENT 10

GRANTEE'S ADDRESS

GRANT AMOUNT

DATE OF GRANT

AMOUNT EXPENDED

PURPOSE OF GRANT

FORM 990-PF

GRANT APPLICATION SUBMISSION INFORMATION
PART XV, LINES 2A THROUGH 2D

STATEMENT 9

NAME AND ADDRESS OF PERSON TO WHOM APPLICATIONS SHOULD BE SUBMITTED

HUDSON BATES, NIPERA 2525 MERIDIAN PKW. SUITE 240 DURHAM NC 27713

FORM AND CONTENT OF APPLICATIONS

APPLICANTS SHOULD SUBMIT DETAILS ON THE PROPOSED INVESTIGATION, A PROPOSED BUDGET & ESTIMATED TIME NECESSARY TO COMPLETE THE PROJECT.

ANY SUBMISSION DEADLINES

MOST APPLICATIONS ARE REPLIES TO PROPOSAL REQUESTS MADE BY NIPERA WITH SPECIFIC DEADLINES.

RESTRICTIONS AND LIMITATIONS ON AWARDS

GRANTS ARE AWARDED ONLY ON THE TOXICITY OF NICKEL AND NICKEL COMPOUNDS.

Application for Extension of Time To File an Exempt Organization Return

OMB No. 1545-1709

► **File a separate application for each return.**

- If you are filing for an **Automatic 3-Month Extension**, complete only **Part I** and check this box ☒ **X**
- If you are filing for an **Additional (Not Automatic) 3-Month Extension**, complete only **Part II** (on page 2 of this form)

Do not complete Part II unless you have already been granted an automatic 3-month extension on a previously filed Form 8868

Electronic filing (e-file). You can electronically file Form 8868 if you need a 3-month automatic extension of time to file (6 months for a corporation required to file Form 990-T), or an additional (not automatic) 3-month extension of time. You can electronically file Form 8868 to request an extension of time to file any of the forms listed in Part I or Part II with the exception of Form 8870, Information Return for Transfers Associated With Certain Personal Benefit Contracts, which must be sent to the IRS in paper format (see instructions). For more details on the electronic filing of this form, visit www.irs.gov/efile and click on **e-file for Charities & Nonprofits**

Part I Automatic 3-Month Extension of Time. Only submit original (no copies needed).

A corporation required to file Form 990-T and requesting an automatic 6-month extension - check this box and complete

Part I only

All other corporations (including 1120-C filers), partnerships, REMICs, and trusts must use Form 7004 to request an extension of time to file income tax returns

Type or print File by the due date for filing your return. See instructions	Name of exempt organization or other filer, see instructions NICKEL PRODUCERS ENVIRONMENTAL RESEARCH ASSOCIATION, INC.	Employer identification number (EIN) or 13-3070077
	Number, street, and room or suite no. If a P O box, see instructions 2525 MERIDIAN PARKWAY, NO. 240	Social security number (SSN)
	City, town or post office, state, and ZIP code. For a foreign address, see instructions DURHAM, NC 27713	

Enter the Return code for the return that this application is for (file a separate application for each return)

04

Application Is For	Return Code	Application Is For	Return Code
Form 990 or Form 990-EZ	01	Form 990-T (corporation)	07
Form 990-BL	02	Form 1041-A	08
Form 4720 (individual)	03	Form 4720	09
Form 990-PF	04	Form 5227	10
Form 990-T (sec. 401(a) or 408(a) trust)	05	Form 6069	11
Form 990-T (trust other than above)	06	Form 8870	12

GERALD M. SCHUETZ

- The books are in the care of ► **2525 MERIDIAN PARKWAY, STE 240 - DURHAM, NC 27713**

Telephone No ► **919-595-1946**

FAX No ►

- If the organization does not have an office or place of business in the United States, check this box ☐
- If this is for a Group Return, enter the organization's four digit Group Exemption Number (GEN) . If this is for the whole group, check this box ☐. If it is for part of the group, check this box ☐ and attach a list with the names and EINs of all members the extension is for

- 1 I request an automatic 3-month (6 months for a corporation required to file Form 990-T) extension of time until **AUGUST 15, 2013**, to file the exempt organization return for the organization named above. The extension is for the organization's return for ☒ calendar year **2012** or ☐ tax year beginning , and ending .

- 2 If the tax year entered in line 1 is for less than 12 months, check reason: ☐ Initial return ☐ Final return ☐ Change in accounting period

3a If this application is for Form 990-BL, 990-PF, 990-T, 4720, or 6069, enter the tentative tax, less any nonrefundable credits. See instructions	3a	\$	0.
b If this application is for Form 990-PF, 990-T, 4720, or 6069, enter any refundable credits and estimated tax payments made. Include any prior year overpayment allowed as a credit	3b	\$	0.
c Balance due. Subtract line 3b from line 3a. Include your payment with this form, if required, by using EFTPS (Electronic Federal Tax Payment System). See instructions	3c	\$	0.

Caution. If you are going to make an electronic fund withdrawal with this Form 8868, see Form 8453-EO and Form 8879-EO for payment instructions

LHA For Privacy Act and Paperwork Reduction Act Notice, see instructions.

Form **8868** (Rev. 1-2013)

NICKEL PRODUCERS ENVIRONMENTAL RESEARCH ASSOCIATION, INC.
ID # 13-3070077
CALENDAR YEAR 2012

STATEMENT 10

PART XV3(A) - GRANTS AND CONTRIBUTIONS PAID DURING THE YEAR

Grantee	Address	Contract Number	Relationship	Foundation Status	Purpose of grant:		Grant Expended
					Title of Study		
Particle Technology Inc.	Illinois	2007-01	None	n/a	Sample Repository Maintenance	\$	6,489
CRAES		2008-01	None	n/a	Invertebrate testing Chinese so	\$	4,000
Bill Stubblefield (Para		2008-27	None	n/a	Manuscript Marne NI Ecotox	\$	(2,125)
Patriarca/Dipartimento di Sanita Alimentare ed							
Animale		2009-17	None	n/a	Kinetics of Ni Met Human	\$	48,742
SKS Consulting Services		2009-25	None	n/a	Review SCOEL, Seilkop-Sivulka	\$	1,925
SKS Consulting Services		2009-26	None	n/a	Seilkop-Sivulka projects	\$	8,225
Angeline Kirby Memorial Health Center,							
Chilean Mining and Metallurgy Research							
Center, Oregon State University, Royal							
Institute of Technology							
G Oberdorster/University of Rochester and L		2010-16	None	n/a	Bioaccessibility inter-lab OSU	\$	3,125
Haber/TERA		2010-17	None	n/a	Vitro and in vivo inhalation	\$	1,750
G. Oberdorster/University of Rochester and L							
Haber/TERA		2010-18	None	n/a	Vitro and in Vivo Inhal support	\$	1,298
wca Environmental Ltd		2011-02	None	n/a	Updating field based Ni threshold analysis	\$	3,458
H Clewell/The Hamner Institute	North Carolina	2011-04	None	n/a	Mode of Action Ni Studies	\$	143,145
S Constant/Epithelix Sarl	Switzerland	2011-07	None	n/a	Dvlpmnt of a 3D in vitro cell	\$	28,108
wca Environmental Ltd		2011-09	None	n/a	wca General Support for Ni EQS	\$	20,264
ARCHE, wca, Windward Env.		2011-10	None	n/a	Dev Env Risk Assmnt FS-ARCHE	\$	9,758
J Goodman/Gradient and S Seilkop/SKS							
Consulting Services		2011-13	None	n/a	Draft Manuscripts	\$	1,374
M Kohrman Vincent/TERA		2011-14	None	n/a	Meta Analy Resp Cancer	\$	10,200
J Goodman/Gradient and S. Seilkop/SKS							
Consulting Services		2011-15	None	n/a	Review Rpts and Manuscripts	\$	1,575
ARCHE, wca, Windward Env		2011-16	None	n/a	Risk Asses Fact Sheet -Windward	\$	2,000
Mutch & Associates		2011-18	None	n/a	Incorporate WHAM 6 & 7	\$	12,350
Odnevall Wallinder/KTH		2011-19	None	n/a	KTH Project	\$	8,275
HydroQual, wca Environmental Ltd, Beijing							
Continental Grand Hotel		2011-20	None	n/a	Attend Ni BLM Wkshp China - Hydroqual	\$	3,100
ARCHE, wca, Windward Env		2011-21	None	n/a	Dvlp Ni RA Fact Sheet-WCA	\$	5,190
South Carolina Research Foundation	South Carolina	2011-23	None	n/a	Marine/Estuarine Sediment Toxicity	\$	66,000
Consulting Support Dr Chandler	South Carolina	2011-24	None	n/a	Marine/Estuarine Sediment Toxicity	\$	12,188
US Geological Survey and ARCHE		2011-25	None	n/a	Toxicity Testing of NiSpiked Se	\$	15,018
ARCHE		2011-26	None	n/a	ARCHE Sediment Risk Characteriz	\$	7,082
Internaional Lead Zinc Research Organization,	1822 East NC Hwy 54						
Inc	Suite 120	2011-AD	None	n/a	ETAP 2012	\$	69,720
NIPERA Staff and Consultants	Durham, NC 27713	2011-AD	None	n/a	ETAP 2011	\$	70,767
WIL Research Laboratories, LLC		2012-01	None	n/a	Method Development Study	\$	4,000
wca Environmental Ltd	Ohio	2012-03	None	n/a	wca Ni EQS Workshop Support	\$	6,272
Sheraton Brussels Hotel	United Kingdom	2012-04	None	n/a	Sheraton	\$	5,199
Galina Messura	Brussels, Belgium	2012-05	None	n/a	Russian Translation of Fact Sheets	\$	1,500
Assessing Risks of Chemicals	North Carolina	2012-06	None	n/a	Publication of sediment prgm-ARCHE	\$	1,482
	Lovendegem, Belgium						

STATEMENT 10

Sed Bioavail Weight of Evidence	\$	9,388
2012 Meeting	\$	1,777
Modeling Spt for Bioavailability	\$	5,061
Uncertainty RA Workshop- Exponent	\$	3,750
Petry at ECOTOC Taskforce	\$	8,288
Updates on Nanomaterial Regulations	\$	30,000
Screen Test of Ni Oxide	\$	3,637
Workshop of Experts on Disease	\$	67,250
Manuscript Marine NI Ecotox	\$	5,625
Field Validation - Wright State	\$	15,000
BLM Use/Validation Australia-WC	\$	10,063
4-Week Nose Inhalation Study	\$	95,000
5-Day Range Finding Study	\$	35,250
Field Validation - Univ of Michigan	\$	67,834
Guidance for BEAL Implementation-Task 1	\$	8,334
Method and Development	\$	9,400
One-Generation Study	\$	116,500
Mixtures Toxicity-CSM	\$	15,000
Support International Workshop Soil China	\$	25,000
Science Diss Tour	\$	6,548
Development of Nickel RA Fact Sheets	\$	321
Purchase Alloys for Study	\$	31,386
Chemicals	\$	180
Additional Expenses Related to Workshop	\$	4,136
		1,156,182

Purpose of grant:

Grantee	Address	Contract	Relationship	Foundation	Title of Study	Amount
		Number		Status		
University of Antwerp		2010-04	None	N/A	Sub-cell fract and tissue Ni An	\$ 1,742
G Oberdorster/University of Rochester and L Haber/TERA		2010-17	None	N/A	Vitro and in vivo inhalation	\$ 8,000
G Oberdorster/University of Rochester and L Haber/TERA		2010-18	None	N/A	Vitro and in Vivo Inhal support	\$ 10,265
wca Environmental Arche		2011-01	None	N/A	Web based BLM tools	\$ 2,260
H Clewell/The Hamner Institute		2011-04	None	N/A	Mode of Action Ni Studies	\$ 130,190
U Gent		2011-05	None	N/A	Extending Chronic Ni BLM	\$ 51,000
S Constant/Epithelix Sarl		2011-07	None	N/A	Dvlpmnt of a 3D in vitro cell	\$ 13,032
ARCHE, wca, Windward Env		2011-10	None	N/A	Dev Env Risk Assmnt FS-ARCHE	\$ 17,122
J Goodman/Gradient and S Seilkop/SKS Consulting Services		2011-13	None	N/A	Draft Manuscripts	\$ 6,162
M Kohrman Vincent/TERA		2011-14	None	N/A	Meta Analy Resp Cancer	\$ 15,300
J Goodman/Gradient and S Seilkop/SKS Consulting Services		2011-15	None	N/A	Review Rpts and Manuscripts	\$ 6,425
Mutch & Associates		2011-17	None	N/A	Assess Metal Persistence	\$ 1,024
Mutch & Associates		2011-18	None	N/A	Incorporate WHAM 6 & 7	\$ 12,350
South Carolina Research Foundation	South Carolina	2011-23	None	N/A	Marine/Estuarine Sediment Toxicity	\$ 65,089
Consulting Support Dr Chandler	South Carolina	2011-24	None	N/A	Marine/Estuarine Sediment Toxicity	\$ 6,562
VITO NV	Belgium	2012-02	None	N/A	VITO MvE inhalation manuscript	\$ 11,200
Assessing Risks of Chemicals	Lovendegem, Bel	2012-06	None	N/A	Publication of sediment prgm-ARCHE	\$ 4,320
Fraunhofer Institute for Molecular Biology and Applied Ecology	Germany	2012-09	None	N/A	Publication of Ni Microcosm Study	\$ 10,000
Assessing Risks of Chemicals	Lovendegem, Bel	2012-10	None	N/A	Modeling Spt for Bioavailability	\$ 17,439
Ghent University	Ghent, Belgium	2012-11	None	N/A	Adv Res on Ni Tox in sediments	\$ 300,000
Toxminds BVBA	Brussels, Belgium	2012-13	None	n/a	Petry at ECOTOC Taskforce	\$ 8,512
Environ International Corp	Massachusetts	2012-16	None	n/a	Workshop of Experts on Disease	\$ 22,750
Wright State University	Ohio	2012-18	None	N/A	Field Validation - Wright State	\$ 15,000
University of Guelph	Canada	2012-19	None	n/a	Weight of Evidence Analysis	\$ 41,605
wca Environmental Ltd	United Kingdom	2012-20	None	n/a	BLM Use/Validation Australia-WC	\$ 1,156
wca Environmental Arche	United Kingdom	2012-21	None	N/A	Dev Bio-Met Bioavailability Tool	\$ 23,875
WIL Research Laboratories, LLC	Ohio	2012-22	None	n/a	4-Week Nose Inhalation Study	\$ 95,000
WIL Research Laboratories, LLC	Ohio	2012-23	None	n/a	5-Day Range Finding Study	\$ 35,250
The Regents of the University of Michigan	Michigan	2012-24	None	N/A	Field Validation - Univ of Michigan	\$ 67,833
Natural Resources Canada	Canada	2012-26	None	N/A	Chronic T/D P Study	\$ 63,931
Southern Research Institute	Alabama	2012-27	None	n/a	Method and Development	\$ 9,400
Southern Research Institute	Alabama	2012-28	None	n/a	One-Generation Study	\$ 116,500
Southern Research Institute	Alabama	2012-29	None	n/a	Acute Perinatal Study	\$ 65,800
Colorado School of Mines	Colorado	2012-30	None	n/a	Mixtures Toxicity-CSM	\$ 15,000
Exponent Inc	Texas	2012-31	None	N/A	Guidance for BEAL Implementation-Task 2	\$ 44,911
Ghent University	Ghent, Belgium	2012-32	None	N/A	Facilitate T r of Ni BLM to others	\$ 16,200
Stantec Consulting Services, Inc	Ohio	2012-35	None	n/a	Effects of Metals on Ambient Matter-Stantec	\$ 8,000
wca Environmental Arche	United Kingdom	2012-37	None	N/A	BLM Logistical Support Australia-WCA	\$ 15,054
Ecotox Services Australia Pty Ltd	Australia	2012-38	None	N/A	BLM Toxicity test Australia-Ecotox Services	\$ 146,256
Environ International Corp	Pennsylvania					
NIPIRA staff and consultants travel	North Carolina	2012-AF	None	n/a	Additional Expenses Related to Workshop	\$ 5,938
						\$ 1,507,453

APPENDIX 1

PROGRAM 4: EMERGING ISSUES

Title:	Reproductive Toxicity Dose-Response, Fertility Effects, and Endocrine Status				
Investigator:	Southern Research				
Project #:	2012-27 Method Validation for Ni in Nickel Sulfate Heptahydrate Aqueous Solution by ICP-AES 2012-28 One-Generation Reproductive Study in Rats 2012-29 Acute Perinatal Study in Rats				
Project Manager: (Initials)	HKB	Project Completion: (Date)	Q4 2018	Workload Weighting: (+ to +++++)	++
Budget 2012 & Prior	Contracts 2012 & Prior	2012 Budget	2012 Contracts	Outstanding At 12/31/2012	
\$415,000	\$317,780	\$415,000	\$317,780	\$191,700	
Description	Studies based on the 1-generation reproductive study protocol will be conducted to obtain relevant data to assist future mechanistic research on nickel induced perinatal lethality				
Objectives	Strategic: <ul style="list-style-type: none"> Assure that the available toxicity and mechanistic data are available to ensure the best possible assessment and classification outcomes for Ni and Ni substances 				
	Specific: <ul style="list-style-type: none"> Generate support data for an investigation of the mechanism of action of nickel induced perinatal loss 				
Potential Business Impact	<ul style="list-style-type: none"> High-quality, relevant mechanistic data are necessary to ensure that correct hazard classifications and risk assessments are implemented/maintained for Ni, particularly since no other human or animal testing will change the current reproductive classification 				
Deliverables	<ul style="list-style-type: none"> Complete method validation for nickel in nickel sulfate heptahydrate aqueous solution by ICP-AES Complete 1-generation study (Q3 2013) Complete acute reproductive toxicity study (Q2 2014) Identify mechanistic research laboratory best suited to conduct research depending on outcome of in vivo reproductive studies (Q4 2014) Conduct mechanistic studies for reproductive and developmental toxicity (2015-2018) 				
KPIs	<ul style="list-style-type: none"> Final report for the 1-generation study (Q3 2013) Final report for the acute reproductive toxicity study (Q2 2014) Final report(s) for the mechanistic studies (Q4 2018) 				
Partners	<ul style="list-style-type: none"> None 				
Regional Relevance	<ul style="list-style-type: none"> Global 				
Driver	<ul style="list-style-type: none"> Regulatory reproductive classification 				

PROJECT UPDATE

Date of Update	June 7, 2013	
Background:		
<p>This project began with two reproductive studies in rats followed by a basic research program designed to answer issues related to the No Adverse Effect Level (NOAEL) for rodent perinatal loss, fertility risk assessment, and ultimately to establish the basis for an investigation of the mode of action of nickel-induced perinatal lethality. Identification of the biological mechanism responsible for nickel-induced perinatal lethality in rats will aid in determining whether the same mechanism is relevant in humans, potentially leading to an explanation for the differences observed in animal studies and human epidemiological studies and creating a possibility of affecting classification. This project will provide robust data needed to assess the relevance of the current reproductive classifications for soluble Ni compounds or alternatively, provide means to promote changes to current classifications. In addition, data generated in this study will be critical in protecting Ni metal from potential classification as a reproductive toxicant in the future. Additionally, careful determination of the NOAEL in this study will provide needed support for re-evaluation of the current RfD for nickel. Investigation of parameters for fertility will aid in conducting more accurate risk assessments and potentially removing "fertility" from consideration by regulators thereby reducing stigmatization. Finally, data from this project can be used to evaluate the potential of Ni substances to be categorized as endocrine disruptors</p>		
New Developments:		
<p>Three contracts will be utilized to conduct the 1-generation based testing phase of this Project. The first is:</p> <ul style="list-style-type: none">2012-27 Method Validation for Ni in Nickel Sulfate Heptahydrate Aqueous Solution by ICP-AES This contract was established to conduct the preliminary work necessary to start the full scale generational studies. No separate report is expected from this contract as the results enable the second and third contracts. <p>The second contract is for the conduct of Task 1:</p> <ul style="list-style-type: none">2012-28 One-Generation Reproductive Study in Rats The results of this task are described in detail below. <p>The final Task and second study will utilize the same protocol as contract 2012-28 except that the exposure period will be for one day only on day 20 of gestation. That Task has not been initiated as of June 7th 2013. The contract number for the third Task and second study is</p> <ul style="list-style-type: none">2012-29 Acute Perinatal Study in Rats		
=====		
STUDY ABSTRACT FOR CONTRACT 2012-28-ONE-GENERATION REPRODUCTIVE STUDY IN RATS		
Contract No.:	2012-28	
Title:	Nickel Sulfate Hexahydrate: One Generation Reproduction Study	
Study No .	13837.01.02	
Sponsor:	NiPERA (Durham, NC)	
Contractor:	Southern Research Institute (Birmingham, AL)	
Study Director:	Eve Mylchreest, Ph D	
PHASES/PROCEDURES	Inspection/Audit Date	Date Study Director/ Management Notified
Final Protocol Review	10/10/12, 10/12/12	10/12/12
Protocol Amendment (A1) Review	11/08/12	12/07/12
Test Substance Administration	11/14/12	12/07/12

PROJECT UPDATE

Date of Update	June 7, 2013	
PHASES/PROCEDURES	Inspection/Audit Date	Date Study Director/Management Notified
Facility and In-Process Audit of Galbraith Laboratories	11/27/12	11/27/12
Protocol Amendment (A2) Review	12/03/12	12/07/12
Protocol Amendment (A3) Review	1/23/13	1/23/13
Litter Evaluations	1/24/13	1/30/13
Protocol Amendment (A4) Review	1/30/13	1/30/13
Study Data/Tables Male and Female Pre-mating	2/05/13, 2/07-08/13, 2/11/13, 2/13-14/13	2/15/13
Protocol Amendment (A5) Review	3/06/13	3/06/13
In-Life Repro Data/Table Audit	3/07-08/13, 3/11-15/13, 3/18-22/13	3/22/13
Pathology CSR and Data/Tables Audit	4/16-19/13, 4/22-24/13	4/25/13
Draft Report and Data Audit	4/26/13, 4/29-30/13, 5/01-08/13	5/08/13
Protocol Amendment (A6) Review	5/20/13	5/21/13
<p>A one-generation reproduction study was conducted with nickel (II) sulfate hexahydrate. An aqueous solution of test substance was administered once daily orally by gavage to F0 generation male and female CrI:CD®(SD) rats (25/sex/group) at dosages of 0, 10, 15, or 20 mg/kg/day. An additional control group (0 mg/kg/day; 25 of each sex) was included in the study. Animals were dosed during pre-mating, mating, gestation, and lactation, until the day prior to euthanasia. Dosing occurred after 10:00 AM to allow time for gastric emptying from nocturnal feeding. Following 70 days of dosing, the F0 rats were paired within their respective dose groups until evidence of mating was observed or 2 weeks had elapsed. Pregnant dams were allowed to deliver and rear their offspring until postpartum day (PPD) 21.</p> <p>Cageside observations for mortality and morbidity were performed daily. Clinical observations were performed weekly. Body weights were recorded weekly during pre-mating, mating, and postmating, and daily during the gestation and postpartum periods. Food consumption was recorded weekly during pre-mating for all animals and postmating for males, and twice weekly during the gestation and postpartum periods. Observations of parturition were made twice on gestation day (GD) 20 and at least every 2 hours 24 hours per day beginning on GD 22, the day of expected delivery. The time of start and completion of parturition was recorded. Maternal care observations were recorded on PPD 0 and 4. Litter examinations (number of live and dead, individual pup weights, clinical observations) were determined on PPD 0 (birth), 4, 7, 14, and 21.</p> <p>At necropsy (F0 females and litters on PPD 21; F0 males after sinning litters [Week 16]), testes, epididymides, prostate, seminal vesicles with coagulating glands, ovaries, thyroid/parathyroid, pituitary, and uterus were weighed, and retained along with macroscopic lesions. Histopathology was conducted on all retained tissues, except for thyroid/parathyroid and coagulating gland, from one control group, from the high-dose group, and from all animals with impaired reproductive performance (e.g. failure to mate, conceive, sire, or deliver healthy offspring). The number of uterine implantation sites was recorded for all cohabited F0 females. The stage of estrus was determined on PPD 21. Blood was collected from F0 dams that had live litters on PPD 21 and serum was analyzed for hormone concentrations (FSH, LH, testosterone, estradiol, prolactin, TSH, T3, and T4).</p> <p>There was no test substance-related mortality nor were there any test substance-related clinical observations or effects on body weight or food consumption in F0 males. There were no test substance macroscopic or microscopic observations, or organ weight changes in F0 males or females.</p> <p>Test substance-related effects on body weight parameters in F0 females were limited to a transient decrease in body weight gain on GD 18–21 (60%, 43%, and 63% lower than controls at 10, 15, and 20 mg/kg/day, respectively), which resulted in lower overall body weight gain at 20 mg/kg/day for the gestation period (17% lower than controls on GD 0 through 21). A corresponding decrease in food consumption occurred on GD 18–21.</p>		

PROJECT UPDATE

Date of Update	June 7, 2013
<p>There were no test substance-related effects on precoital interval, mating, fertility, gestation length, number of implantation sites, or post-implantation loss. There was a test substance-related increase in total litter loss at all dosages in F0 females. The incidence of dams with total litter loss was 9.5%, 21%, 33%, and 32% at 0, 10, 15, and 20 mg/kg/day, respectively. In the majority of cases, the total litter loss occurred on the day of birth (PPD 0) or PPD 1 and after an abnormally long littering process (≥ 10 hours). Maternal care was reduced on PPD 0; the incidence of dams with reduced maternal care was 9.5%, 21%, 28.6%, and 27.3% at 0, 10, 15, and 20 mg/kg/day, respectively and occurred predominantly in dams that had total litter loss. Reduced maternal care was characterized by poor or no nest building (pups scattered in cage), pups not cleaned, and/or no willingness to nurse pups. Clinical observations noted in some dams with total litter loss included red vaginal discharge, hunched posture, excessive salivation, dehydration, and poor grooming.</p> <p>There was no direct test substance-related mortality in F0 females during the study, however, unscheduled euthanasia occurred as a result of difficult and/or prolonged parturition (dystocia). The incidence of pregnant dams showing dystocia was 2.3%, 5%, 4.5%, and 8.7% at 0, 10, 15, and 20 mg/kg/day, respectively. The dystocia was considered possibly test substance-related because it may represent another manifestation of the disruption of the normal process of parturition that was seen in other animals as total litter loss.</p> <p>The number of pups born was similar across groups but the live-birth index was 79% and 80% at 15 and 20 mg/kg/day, respectively, compared to 93-94% in controls, as a result of the lower number of pups born alive at these dosages. In addition, the gestation index was slightly lower at 15 and 20 mg/kg/day (95-96% vs. 100% in controls), and was due to one litter with all dead pups at birth in each the 15 and 20 mg/kg/day groups.</p> <p>Litter survival was 78.9%, 70.0%, and 70.0% at 10, 15, 20 mg/kg/day, respectively, compared to 90.5% in controls. The decreased litter survival was due to total litter loss, which occurred on PPD 0 or PPD 1 for most of the affected litters. Consequent to the total litter loss prior to PPD 4, the survival index for PPD 0-4 and the number of live pups per litter on PPD 4 were decreased at all dosages. The mean survival index on Days 0-4 was 62%, 62%, and 72%, at 10, 15, 20 mg/kg/day, respectively, compared to 82-85% in the control groups. The mean number of pups per litter on PPD 4 was 6.9, 7.0, and 7.7, at 10, 15, 20 mg/kg/day, respectively, compared to 10.3 and 9.4 in the control groups. Decreased survival persisted beyond PPD 4 at 20 mg/kg/day, as indicated by an 89% survival index on Days 4-21 compared to 96-98% in controls.</p> <p>There was a test substance-related increase in the incidence of pups per litter found dead or euthanized moribund on PPD 0-4 at all dosages (31%, 39%, and 34% at 10, 15, 20 mg/kg/day, respectively, compared to 13% in controls). Clinical observations in pups prior to death or moribund euthanasia included abnormal breathing, cold to touch, emaciated, no milk spot, non-responsive to stimuli, and subcutaneous hematoma. F1 pup weights were not affected by test substance administration.</p> <p>The concentration of TSH in F0 females was 54% higher than controls at 20 mg/kg/day and was considered test substance-related because of the magnitude of the dose-dependent change. However, it was not considered adverse since the biological significance of increased TSH in the absence of lower T3 or T4 concentrations or change in thyroid weight is questionable. Other hormones were unchanged (FSH, prolactin) or the concentrations were below the limit of quantification (LH, testosterone, and estradiol). The distribution of estrous cycle stages in F0 females was similar across groups.</p> <p>Under the conditions of this study, a no-observed-adverse-effect level (NOAEL) for reproductive toxicity was not determined based on total litter loss at ≥ 10 mg/kg/day.</p>	

PROGRAM 3: NICKEL METAL CLASSIFICATION PROJECTS

APPENDIX 1

Title: Filling Data Gaps on Cancer Mode of Action: In vivo Studies					
Investigator: The Hamner Institute					
Project #: 2011-04					
Project Manager: (Initials)	ARO	Project Duration: (Date)	4Q 2012	Workload Weighting: (+ to +++) ¹⁹	+++
Budget 2012 & Prior	Contracts 2012 & Prior	2012 Budget	2012 Contracts	Outstanding At 12/31/2012	
\$633,335	\$633,335	\$200,000	\$2,000	\$130,190	
Description	This research project will look at identifying markers of mode of action for carcinogenicity of nickel. For this purpose, a 4-week rat inhalation study with two reference compounds (nickel sulfate hexahydrate and nickel subsulfide) will be conducted and gene expression analysis in lung tissue will be assessed to identify dose-dependent transitions that are relevant to the mode of action for carcinogenicity of nickel. Analyses of nickel lung levels, bronchio-alveolar lavage fluid (BALF), and histopathology will complement the gene expression results.				
Objectives	<p>Strategic: Advance the knowledge on the key determinants of carcinogenicity and mode of action for nickel-containing substances in anticipation of IARC's (International Agency for Research on Cancer) future discussions on carcinogenicity of nickel metal and to refine the risk characterization for individual nickel substances as well as mixtures</p> <p>Specific: Generate new data on cellular pathways that are of high relevance for the tumorigenicity of nickel substances <i>in vivo</i>, and relate these changes to the bioavailability of nickel</p>				
Potential Business Impact	<ul style="list-style-type: none"> o Further knowledge on the mode of action for tumor induction by nickel may decrease the chances for a more restrictive classification of nickel metal by IARC. o The identification of thresholds for initial events can provide further support for a nonlinear risk assessment for the carcinogenicity of nickel. 				
Deliverables	<ul style="list-style-type: none"> o Contract signed 2Q 2011 o Progress reports received 3Q 2011, 4Q 2011, 1Q 2012, 2 Q 2012, 3 Q 2012, 4 Q 2012 o Manuscript 1 expected 2Q 2013 o Manuscript 2 expected 3Q 2013 				
KPIs	<ul style="list-style-type: none"> o On-time delivery o On budget o Quality of work o Meet objective 				
Partners	<ul style="list-style-type: none"> o None 				
Regional Relevance	<ul style="list-style-type: none"> o Global 				
Driver	<ul style="list-style-type: none"> o Regulatory 				

¹⁹ + = up 1 week; ++ = 2 – 4 weeks; +++ = 5 – 16 weeks; ++++ = 17 – 26 weeks; +++++ > 26 weeks

PROJECT UPDATE

Date of Update	April 8, 2013
<p>Background:</p> <p>This initiative was started to identify key datasets that would allow us to improve our understanding of the carcinogenicity of nickel substances. Obtaining this information will place us in a better position to prevent any changes to the current carcinogen classification of nickel metal as IARC Group 2B and to refine the risk characterization for individual nickel substances as well as mixtures.</p> <p>In November 2010, proposals for this work were received from 5 research groups. L. Haber and G. Oberdörster acted as reviewers for these projects. After careful evaluation, all three reviewers (including A. Oller of NiPERA) identified the Hamner Institute and Epithelix Sarl as the top ranking groups for the in vivo and in vitro studies, respectively.</p> <p>The in vivo studies at the Hamner Institute consist of exposing rats for one and four weeks, via inhalation, to 4 levels of nickel sulfate and nickel subsulfide. At the end of exposure, the following assays will be conducted:</p> <ul style="list-style-type: none"> • Isolation of mRNA (from whole lung and dissected sites) and gene expression analysis in lung bronchio-alveolar tissue (target for tumor induction by nickel) to assess the time and dose dependent induction of genes triggered by nickel exposure • Benchmark dose analysis of the gene expression changes to identify potential mode(s)-of-action for the various forms of nickel (e.g., nickel subsulfide, nickel sulfate hexahydrate) and assess dose-dependent transitions • Measurement of nickel levels in lungs of exposed animals after 4 weeks exposure • Isolation of bronchio-alveolar lavage fluid (BALF) to assess inflammation • Histopathological examination of lung tissues to assess toxicity and inflammation <p>A contract with the Hamner Research Institutes was signed in April 2011. Drs. D. Dodd and H. Clewell are the principal investigators for these studies. The contract was revised in December 2011 to include costs associated with Transmission Electron Microscopy (TEM) studies to be conducted at North Carolina State University (\$31,335). The first progress report for this project was received in July 2011. This report described the training on microdissection received by the personnel at the Hamner and included results from the nickel sulfate aerosol characterization, in anticipation of the initiation of the in vivo studies. The 1 and 4 week inhalation studies with nickel sulfate were completed in August 2011. For the 1-week exposure, the achieved mean (\pm standard deviation) concentrations were 0.00 (\pm 0.00), 0.128 (\pm 0.027), 0.246 (\pm 0.043), 0.496 (\pm 0.062), and 1.020 (\pm 0.107) mg/m³ for target exposure concentrations of 0, 0.125, 0.25, 0.5, and 1.0 mg/m³ nickel sulfate hexahydrate, respectively. For the 4-week exposure, mean (\pm SD) concentrations were 0.00 (\pm 0.00), 0.138 (\pm 0.037), 0.246 (\pm 0.055), 0.502 (\pm 0.051), and 1.004 (\pm 0.075) mg/m³ (same target exposure concentrations).</p> <p>The average mass median aerodynamic diameters (MMAD) for the 1-week exposure were 0.822, 0.882, 0.999, and 1.087 μm for target exposure concentrations of 0.125, 0.25, 0.5, and 1.0 mg/m³ nickel sulfate hexahydrate, respectively. For the 4-week exposure, the average MMAD were 0.840, 0.918, 1.093, and 1.160 μm (same target exposure concentrations).</p> <p>A second report for this project was received in October 2011. The report indicated that data analysis for lung histopathology, BALF cytology, BALF supernatant markers, lung gene expression, and lung nickel burden were in progress. Nickel sulfate exposure-related histopathology effects (details not available) were observed in the highest concentration group following four weeks exposure. Per study protocol, lung histopathology and BALF cytology evaluations will be performed in lower concentration exposure groups of the 4-week time point until a NOAEL is achieved.</p> <p>Regarding the analysis of micro-dissected lung tissue, select lung lobes from the high nickel sulfate concentration and control groups of the 4-week exposed rats (n=16) were micro-dissected for removal of</p>	

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<p>distal airways (Protocol Amendment 1). The remaining non-dissected tissues were also saved. Gene expression and nickel burden analysis are being conducted on the micro-dissected and remaining non-dissected tissue. Results from this procedure will be used to decide on the processing of lung samples from rats of the lower concentration exposure groups.</p> <p>Due to a microbiology status report by Charles River Laboratories that F344 animals shipped from their K83 breeding area facility may be positive for <i>Strep pneumoniae</i>, the Hamner initiated the collection of oropharyngeal swabs from affected animals. Lung histopathology and BALF cytology indicated that the <i>Strep</i>-positive animals showed no significant impact on BAL cytology differential count or an indication of infection following microscopic examination. These results indicated that the positive <i>Strep. pneumoniae</i> will not affect the dose-response relationships of nickel sulfate for these endpoints. Since Charles River Laboratories (CRL) do not plan to depopulate their F344 colony because of occasional positive findings of <i>Strep</i> in their facility, a decision was made and agreed on with the lab to continue using the F344 rat from CRL for the next 4-week inhalation study with nickel subsulfide. Oral swab or fecal samples will be taken from all nickel subsulfide study animals at necropsy and stored for possible future analysis of <i>Streptococcus</i></p> <p>The protocol for this project was amended 3 times in 2011: the first time to include the testing of the animals for the presence of <i>Streptococcus pneumoniae</i> and to do microdissections in tissues stored in RNA-later at -70°C; the second time to change the fixative to be used in the nickel subsulfide study to allow the use of TEM to study the presence of particles; and the third time to separate the lung tissue for nickel analysis prior to the addition of RNA-later, as the presence of RNA-later appeared to confound the assessment of nickel lung levels in the nickel sulfate study.</p> <p>Wright Dust Feeders (WDF) were selected for the generation of nickel subsulfide particles into the inhalation exposure chambers. Different WDF outputs were tested to achieve accurate and reproducible target exposure concentrations</p> <p>New Developments:</p> <p>A fourth progress report was received in Feb 2012. This report included the results from the completed in-life phase of the Ni subsulfide study, the results from BALF in Ni sulfate exposed animals and preliminary gene expression results. These reports were reviewed by the external reviewers and comments were provided back to the researchers. In May 2012 the following reports were submitted to NiPERA:</p> <ol style="list-style-type: none"> 1. Final reports for the two inhalation exposure reports (nickel sulfate and nickel subsulfide) that provide details and summary of animal exposure concentrations, MMADs, and environmental conditions. These reports were revised as per the reviewers' comments. 2. Two BAL (supernatant) reports (nickel sulfate and nickel subsulfide). 3. One draft BAL cytology summary report (nickel sulfate and nickel subsulfide combined). 4. One draft lung histopathology summary report (nickel sulfate and nickel subsulfide combined). 5. One draft lung tissue nickel burden report (nickel subsulfide). <p>In June 2012, dissected lung tissue from Fischer rats were sent to Mucilair for a related project (Contract No. 2011-07). At this time, tissues from the Ni subsulfide high exposure animals were sent to NC State University for TEM analysis. In July 2012 revised reports addressing NiPERA's previous comments and questions were submitted. The reports include:</p> <ol style="list-style-type: none"> 1. Histopathology – nickel sulfate and nickel subsulfide studies 2. BAL Cytology – nickel sulfate and nickel subsulfide studies 	

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<ol style="list-style-type: none"> 3. BAL fluid analysis – nickel subsulfide study 4. Lung burden analysis – nickel sulfate study 5. Lung burden analysis – nickel subsulfide study 	
<p>On October 2012, the preliminary gene expression reports were submitted and a follow-up meeting took place between researchers at the Hamner Research Institute and NiPERA staff.</p> <p>The protocol for this project was amended in July 2012 to cover the work effort and cost associated with the preparation and shipping of lung samples to Epithelix and in November 2012 to update the schedule of manuscript deliverables for 1Q 2013. The authors of the research prepared two abstracts for presentation at the 2013 Society of Toxicology Meeting. The titles of the posters are listed below.</p> <p style="padding-left: 40px;">One-Week and Four-Week Inhalation Toxicity Studies of Nickel Sulfate and Nickel Subsulfide in Rats. D.E. Dodd, H.J. Clewell, M.A. Sochaski, H.G. Wall, G.A. Willson, and A.R. Oller.</p> <p style="padding-left: 40px;">Genomic Dose Response in Lung after Nickel(II) Sulfate and Nickel Subsulfide Inhalation in Male F344 Rats. Efremenko, Alina; Pluta, Linda; Black, Michael; Dodd, Darol E.; Oller, Adriana, Clewell, Harvey J.</p> <p>In December 2012, revised gene expression reports were submitted separately for Ni sulfate and Ni subsulfide and a third report that compared the results from both studies was included. Results indicated that the adjusted BMDs (benchmark dose) after one week of exposure were roughly a factor of two lower for Ni subsulfide inhalation than for Ni sulfate, suggesting that at the same inhaled nickel concentration the internal cellular exposure to nickel is greater when the administered compound is Ni subsulfide. This relationship is diminished after four weeks of exposure, such that several categories, including chemotaxis, three developmental subcategories (activation of Erk, Vegf signaling, and Wnt signaling), and signal transduction had similar adjusted BMDs for both compounds.</p> <p>The lowest BMD for Ni sulfate after one week of exposure (0.070 mg Ni/m^3) was roughly three times higher than the lowest BMD for Ni subsulfide (0.025 mg Ni/m^3). For both compounds the lowest BMD category after one week of exposure was immune response. After four weeks of exposure the lowest BMDs were similar for both compounds but the subcategory was G-protein signaling Rac3 regulation pathway for Ni sulfate and development growth hormone signaling via STATs and PLC/IP3 for Ni subsulfide. These evaluations focused on pathway categories associated with cellular stress and carcinogenicity, and did not include the following pathway categories: metabolism, biosynthesis, transcription, translation, transport, blood coagulation, cardiac hypertrophy, muscle contraction, and neuro-physiological processes.</p> <p>With inclusion of these categories, the lowest BMD after one week of exposure for Ni subsulfide was 0.023 mg Ni/m^3 for cholesterol biosynthesis and for Ni sulfate it was 0.044 mg Ni/m^3 for the prostaglandin 2 biosynthesis and metabolism FM. After four weeks of exposure the lowest BMDs for both compounds were for pathway categories related to metabolism. These reports were reviewed during 1Q 2013 by the external reviewers L. Haber and G. Oberdorster.</p> <p>It is expected that these in vivo studies will identify the most relevant markers that will then be used in the follow-up in vitro studies (2013-2014) to examine more closely the kinetics of gene expression induction as a function of nickel uptake for various nickel substances. This will be done using the Muclair rat and human cell systems in parallel.</p>	

APPENDIX 1

PROGRAM 3: NICKEL METAL CLASSIFICATION PROJECTS

Title: Alloys HERAG validation Inconel (<i>In Vivo</i> Inhalation Study) Investigator: WIL Research Laboratories, Kirby Memorial Health Center, Jet Pulverizer, CCE Technologies, Particle Technology Labs, Powder Alloy Corporation, & Center for Innovative Sintered Products (Penn State University) Project #: 2012-01 WIL Research Laboratories 2012-22 WIL Research Laboratories 2012-23 WIL Research Laboratories 2012-AC Jet Pulverizer, CCE Technologies, Particle Technology Labs, Powder Alloy Corporation					
Project Manager: (Initials)	TLD	Project Completion: (Date)	Q4 2013	Workload Weighting: (+ to +++) ²⁴	++
Budget 2012 & Prior	Contracts 2012 & Prior	2012 Budget	2012 Contracts	Outstanding At 12/31/2012	
\$300,000	\$295,886	\$150,000	\$295,886	\$130,250	
Description	Inconel is an alloy containing ~57% nickel, ~14.6% iron, and ~18.3% chromium. It was one of several substances used in an inter-laboratory <i>in vitro</i> bioaccessibility study to measure the dissolution of metal ions in simulated/artificial biological fluids. The amount of nickel metal ions released did not necessarily relate to the content/percentage of nickel within the substances tested. It was hypothesized that the <i>in vivo</i> toxicity of the tested substances may be due to the amount of nickel released in biological fluids rather than the amount of nickel originally in the substance.				
Objectives	Strategic: This is a "proof of concept" study to determine the correlation between bioelution <i>in vitro</i> data using synthetic lung fluid and <i>in vivo</i> inhalation toxicity with rats. The main objective is to support the hypothesis that the amount of nickel released during bioelution in relevant lung fluids, rather than nickel content, correlates to <i>in vivo</i> toxicity. The results of this study will be considered together with previous results obtained with SS316 powder and will add to the robustness of the relative metal release approach for the classification of alloys and complex materials.				
	Specific: To evaluate the dose-response toxicity of Inconel powder when administered via nose-only inhalation to Wistar rats for 28 days (5 days per week for 4 weeks).				
Potential Business Impact	<ul style="list-style-type: none"> For regulatory purposes, we have taken the position that for complex mixtures and alloys, <i>in vivo</i> metal toxicity is related to the amount of metal ions released in biological fluids (effective concentration), rather than to the content of the metal. <i>In vitro</i> bioelution data is available regarding the release of metal ions in synthetic biological fluids. A comparison of the <i>in vitro</i> bioelution data with this <i>in vivo</i> toxicity study can be used to validate our position. At present an alloy like SS316L with 10% Ni would get classified as STOT RE1 based on Ni content, applying the mixtures rule. However, if the mixtures rule were to be applied to the effective concentration of the metal in the alloy (based on relative bioaccessibility), no classification of SS316L would be warranted. 				
Deliverables	<ul style="list-style-type: none"> 3 months duration from project initiation 				
KPIs	<ul style="list-style-type: none"> On-time delivery On budget Quality of work 				

²⁴ + = up 1 week; ++ = 2 – 4 weeks; +++ = 5 – 16 weeks; ++++ = 17 – 26 weeks; +++++ > 26 weeks

	<ul style="list-style-type: none">○ Meet objective
Partners	<ul style="list-style-type: none">○ None
Regional Relevance	<ul style="list-style-type: none">○ Global
Driver	<ul style="list-style-type: none">○ Regulatory

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Date of Update	May 3, 2013
<p>Background:</p> <p>For regulatory purposes, the metal commodities, including nickel have taken the position that for complex mixtures and alloys, <i>in vivo</i> metal toxicity is related to the amount of metal ions released in relevant biological fluids (effective concentration of the metal), rather than to the content of the metal.</p> <p>Right now, complex mixtures and alloys are not classified based on their intrinsic toxicity but rather by applying the mixtures rule, based on composition of the alloy/complex mixture, and considering the existing classifications of the metal components.</p> <p>For alloys and complex mixtures, the composition does not necessarily correlate well with metal ion release in biological fluids. Under HERAG, industry has proposed an approach to classification of complex mixtures and alloys that is based on determining the "effective concentration" of a metal in the alloy/complex mixture. The relative <i>in vitro</i> metal release from the mixture/alloy and from its individual components allows the calculation of the "effective concentration." Applying the mixtures rule to the "effective concentration" rather than to the composition would result in more accurate predictions of toxicity for complex mixtures/alloys and classifications.</p> <p>In order to convince regulatory authorities, some examples are needed. At present an alloy like SS316L with 10% Ni would get classified as STOT RE1 based on Ni content, applying the mixtures rule. However, if the mixtures rule were to be applied to the effective concentration of the metal in the alloy (based on relative bioaccessibility), no classification for toxicity for SS316L would be predicted. An <i>in vivo</i> inhalation study has confirmed this result.</p> <p>Inconel was suggested as another example that should be tested by comparing the <i>in vitro</i> bioelution data with this <i>in vivo</i> toxicity. This could further validate the industry position.</p> <p>New Developments:</p> <p>NiPERA contacted several laboratories to determine their interest in this project. After receiving several proposals, the project was awarded to WIL Research Laboratories with Dan Kirkpatrick and Jeff Weinberg as lead project managers. Their proposal suggested that ~5 kg of Inconel would be needed to generate the appropriate size aerosol, conduct a 5-day range finding study to determine appropriate Inconel doses to test, and conduct the 28-day <i>in vivo</i> inhalation study with 5 rats per dose. In November 2011, 2 kg of Inconel was shipped from our repository at Particle Technology Labs (PTL) to WIL labs to evaluate the process for generating the appropriate aerosol size (MMAD 1.5 – 3 µm), with the intention to ship another 3 kg for the 5-day range finding and 28-day studies. Upon initial screening of the particle size data, WIL labs realized that we would need ~10X more Inconel than we have. The repository had ~7 kg prior to starting this project, with 2 kg of that already shipped to WIL labs. In December, we contacted the manufacturer (Powder Alloy Corporation, Paul Keith) of our original Inconel sample to see about the possibility of producing more Inconel. We requested to have ~40 lbs of Inconel produced. Production began in January and was completed in April 2012. Of this new batch of Inconel, a sample amount of 5 lbs of Inconel was shipped to CCE Technologies to try to reduce the particle size via jet milling. The jet milling was successful after several days of milling the small batch of Inconel, but would not be feasible (cost/time) for the ~15 lbs needed for the animal study. In June 2012, Jet Pulverizer was contacted to mill the 15 lbs of Inconel needed for the animal study. In August 2012, 8 grams of the milled Inconel (~2 microns) was sent to Kirby Memorial for bioelution testing, 6 lbs of the milled Inconel (~2 microns) was sent to WIL Labs in preparation for the animal testing, and ~3 lbs of the Inconel mill sweeps (large particle size – not in spec) were sent to our repository for storage at Particle Tech Labs.</p> <p>In the meantime, as a new batch of Inconel was being produced, an additional 5 kg of Inconel was sent from the repository to WIL labs so that they could work on the method development of generating the</p>	

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Date of Update	May 3, 2013
<p>appropriate particle size for the <i>in vivo</i> study. The method development portion of this project was completed by February 2012. Separate contracts for this project were prepared for the 5-day range finding study, the 28-day <i>in vivo</i> study, and sample characterization of the new batch of Inconel currently in production.</p> <p>In August 2012, bioelution testing was done using the new batch of milled Inconel. The milled Inconel yielded very different results compared to the Inconel results obtained previously (from the original batch of Inconel that was not milled). The new results indicated that Inconel released as much nickel in synthetic interstitial fluid as nickel metal. The previous results with the original, non-milled Inconel indicated very low (~260 times less) nickel release. In November 2012, both the old and new batch of Inconel were re-tested in the bioelution assay to be sure there was no error. The results were similar. We considered the idea that the milling process itself contributed to the differences by modifying the surface properties with "holes". Particle Tech Labs was contacted to conduct sample characterization (surface area, particle size, elemental analysis, and x-ray spectroscopy) on the new batch of Inconel in the milled and unmilled state. The unmilled Inconel (new batch) has similar characteristics as those of the original Inconel sample previously used. In December 2012, we learned that the surface properties could possibly be restored with an annealing/aging treatment (720°C for 8 hrs in furnace purged with argon for 2 hrs prior, cool furnace to 620°C and hold for total aging time of 18 hrs, continue argon flow until powder cools to room temperature). In March 2013, we contacted The Center for Innovative Sintered Products of Pennsylvania State University to conduct the annealing process for a small sample of the milled Inconel to see if it affected the bioelution results. The milled and annealed Inconel sample was sent to Kirby Memorial Labs for bioelution testing and the results will be available in May 2013. Due to the issues with the bioelution results, the animal studies are on hold until we are able to possibly restore the surface properties and yield bioelution results similar to those of the original unmilled Inconel results. Once that is achieved, the bioelution data can be used for direct comparison with the results of the future <i>in vivo</i> study.</p>	

APPENDIX 1

PROGRAM 6: NICKEL ENVIRONMENTAL QUALITY STANDARDS PROJECTS

Title: Ecotoxicology Technical Advisory Panel (ETAP) Investigator: NiPERA Staff and Consultants Project #: 2011-AD 2012-AD					
Project Manager: (Initials)	CES	Project Completion: (Date)	ONGOING	Workload Weighting: (+ to +++) ⁴³	+++
Budget 2012 & 2011	Contracts 2012 & 2011	2012 Budget	2012 Contracts	Outstanding At 12/31/2012	
\$150,000	\$140,487	\$75,000	\$69,720	\$0	
Description	The goal of this project is to establish an environmental advisory panel that can provide guidance to NiPERA on ongoing and future research regarding ecotoxicological issues. This Panel also provides a mechanism for co-funding of research pertinent to many metals.				
Objectives	Strategic: To develop and communicate science that supports bioavailability normalization of metals in water, sediment, and soil to facilitate acceptance of bioavailability-based risk assessment approaches for metals				
	Specific: To strategically address metal ecotoxicological issues that question the relevance of taking bioavailability and other metal-specific characteristics (e.g., essentiality, background concentrations) into consideration when assessing the risk of metals to the environment				
Potential Business Impact	<ul style="list-style-type: none"> Many issues faced by the nickel industry with respect to incorporating metal-specific methodologies, such as bioavailability normalization, are common to other metals. ETAP sponsors pool financial and intellectual resources to sponsor environmental and ecotoxicological research throughout the international scientific community This leveraged funding approach supports the comprehensive incorporation of metal ecotoxicology principles into regulatory risk assessment programs, including the European Union's (EU) Existing Substances Risk Assessment and REACH regulations. Incorporating bioavailability into metals risk assessment approaches results in reasonable and science-based environmental quality standards for metals. 				
Deliverables	<ul style="list-style-type: none"> ETAP sponsors many specific projects each year and each project may have a different set of deliverables and timelines 				
KPIs	<ul style="list-style-type: none"> On-time delivery On budget Quality of work Meet objective 				
Partners	<ul style="list-style-type: none"> Cobalt Development Institute (CDI), the European Aluminum Association (EAA), the International Copper Association (ICA), the International Zinc Association (IZA), the International Lead Zinc Research Organization (ILZRO), the International Molybdenum Association (IMoA), and Rio Tinto Industrial Minerals 				
Regional Relevance	<ul style="list-style-type: none"> Global 				
Driver	<ul style="list-style-type: none"> Regulatory Action 				

⁴³ + = up 1 week, ++ = 2 – 4 weeks, +++ = 5 – 16 weeks; ++++ = 17 – 26 weeks; +++++ > 26 weeks

PROJECT DESCRIPTION

Date of Update	May 9, 2013
<p>Background:</p> <p>ETAP is supported by CDI, EAA, ICA, ICDA, ILZRO, IMoA, NiPERA, and Rio Tinto Industrial Minerals. ETAP was established in 1994 by ICA, ILZRO, and NiPERA.</p> <p>The panel currently consists of six scientists with expertise in different areas of environmental chemistry, ecotoxicology (terrestrial and aquatic), and environmental risk assessment. Effort is made to represent the global scientific community with the panel selection. The panel itself meets twice per year to discuss short- and long-term issues of interest to the metals industry.</p> <p>Current Panel Composition and Area of Expertise:</p> <p>A. Fairbrother (Parametrix, USA): Terrestrial Risk Assessment R. Blust (University of Antwerp, Belgium): Aquatic Toxicology A. Burton (Wright State University, USA): Sediment Toxicology P. Campbell (University of Quebec, Canada): Environmental Chemistry M. McLaughlin (CSIRO Land and Water, Australia): Soil Chemistry and Toxicology K. Farley (Manhattan College): Environmental Fate and Effects Modeling</p> <p>In Q2 of 2011, the ETAP coordinators spoke with the five current ETAP panel members to get feedback on the operation of ETAP, and to identify any areas of expertise that the current panel does not cover. Several of the panel members identified the area of environmental modeling as a deficiency. To this end, a proposal was made to invite Dr. Kevin Farley of Manhattan College, NY, USA, to join the ETAP panel. Dr. Farley is one of the developers of the Unit World Model, and he frequently consults with the metals industry on issues pertaining to the environmental fate of metals. He was formally invited to join the ETAP panel in November 2011, and will begin his first two-year term in 2012.</p> <p>New Developments:</p> <p>The following sections provide updates on meetings and projects that were active during the December 31, 2011, to December 31, 2012, reporting period, including: i) completed projects, ii) ongoing projects, iii) approved projects under negotiation, and iv) new projects under consideration. The 2012 ETAP meeting is also discussed.</p> <p>One ETAP Meeting was held during the current reporting period. This meeting was held in August, 2012 in Chicago, IL, USA.</p> <p>Support for ETAP is sought on a continuing basis at the rate of \$75,000 per year.</p> <p>1) Completed Projects</p> <p><i>Metals Mixtures Modeling Evaluation.</i> While the concepts encompassing mixture toxicity and modeling have been around for decades, only recently have new technologies (BLMs) been expanded to consider mixture scenarios. Although current environmental regulations rarely require assessment of chemicals mixtures, the metals industries consider research on mixtures in the environment and development of efficient and economic science-based risk assessment approaches for metals mixtures essential to preparing for future regulatory demands and vital for ensuring adequate environmental protection. The goal of the current project is to evaluate available technologies for modeling metals mixtures in various media (freshwater, marine, terrestrial, bulk sediment) using bioavailability-based approaches, starting with the freshwater compartment. Researchers will apply their respective technologies to datasets provided by the ETAP sponsors to demonstrate the capacity of their models to predict observed results and illustrate/identify principal toxicants within the exposures. A final report to the Sponsors will be submitted with detailed explanation of methods, results and notable findings relative to uncharacteristic interactions,</p>	

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<p>samples or model refinements Shortly following the completion of the modeling exercise, a 2-3 day workshop was held with participation from all research groups and Sponsors, among others from the scientific and industry community The workshop served as the venue for each research group to present the findings of their evaluation and allow open discussion of the various technologies for constructive scrutiny The workshop/discussion identified areas of potential refinements/adaptations among the various technologies and a preliminary synthesis of the project for publication.</p> <p><i>Metals Mixtures Modeling Evaluation Workshop</i> NiPERA, along with other ETAP sponsors organized and attended a research meeting on Metals Mixtures Modeling held on May17-19 in Brussels, Belgium The research meeting was organized by NiPERA, ICA, and IZA and was attended by researchers from the US Geological Survey, Centre for Ecology and Hydrology, HDR Hydroqual, The Japanese National Institute of Advanced Industrial Science and Technology, University of Ghent, Clemson University, University of Antwerp, Loyola University Chicago, Centro de Investigación Minera y Metalúrgica, Arcadis consultancy, ARCHE consultancy, Rio Tinto, and several commodities associations. The purpose of the collaborative research meeting was to evaluate the findings of the Metals Mixtures Modeling Evaluation, which was a project undertaken to compare and contrast the available technologies for assessing metal mixture interactions in freshwater using bioavailability-based approaches. The four research groups that participated in the comparative modeling exercise (US. Geological Survey, Centre for Ecology and Hydrology, HDR Hydroqual, The Japanese National Institute of Advanced Industrial Science and Technology) each made presentations on their individual metals mixtures bioavailability models (e.g., background and development, methods applied to modeling each mixtures dataset, in-depth discussion of the results of the model predictions, and interesting findings and interpretations). Research presentations were followed by group discussions on commonalities and differences of the approaches, cross-technology adaptation, and future research needs. The discussions were successful in providing a platform for assessing the current state of the science for metals mixtures bioavailability models, as well as prioritizing actions and next steps for future metals mixtures research needs.</p> <p><i>Modeling metal speciation in marine and estuarine waters.</i> Trace element (TE)-marine natural organic matter (NOM) binding is an important factor in marine and freshwater metal availability to aquatic organisms and possibly toxicity. In marine waters, part of the NOM has a different origin/quality than freshwater NOM. Application of existing freshwater/marine speciation models [e.g., WHAM (V or VI), MAMPEC model, NICA model, and marine TE-NOM L1 and L2 binding constants] result in different elemental-NOM binding constants and thus calculated free ion activities. Further, many of these models were developed and calibrated for dilute ionic strength environments and their estimates of the activities of TE species in marine and estuarine waters may show significant error. In addition, the capabilities of various models to deal with non-equilibrium phenomena, such as formation of precipitates in mixing zones in salt wedge estuaries that may act to remove TEs from the water column, are of interest. Fundamental background information on the differences among the speciation behaviors of TEs in high versus dilute ionic strength aquatic environments is required, with focus on key driving parameters that have an influence on metal speciation, such as NOM Information on the binding affinities of TEs to marine NOM should also be examined. To this end, a project to examine approaches for expanding existing metal speciation models to estuarine and marine waters was contracted with Ed Tipping and Steve Lofts of the Centre for Ecology and Hydrology Lancaster (UK) Tipping is the developer of WHAM, and the modification of WHAM to marine systems brings the benefit of streamlining metal speciation tools for both freshwater and marine systems. An update on the project was delivered by Tipping and Lofts at the SETAC Europe meeting in May 2010. A final report was received in July, 2012.</p> <p><i>Determining background concentrations of trace elements in marine and estuarine waters</i> Increased regulatory attention on the occurrence of TEs in coastal marine and estuarine water for the purpose of standard setting (e.g., Water Framework Directive in the EU, Ambient Water Quality Criteria in the U.S.) and chemical management programs (e.g., REACH) has prompted the need for risk assessments in marine and estuarine waters. Information on the availability of measurements of TEs in natural,</p>	

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<p>unimpacted marine and estuarine systems is not as prevalent as for freshwater systems; however, it is crucial to consider these data in risk assessment and standard setting processes. Knowledge gaps also exist in the understanding of available data measuring the occurrence of NOM and DOC (dissolved organic carbons) in these systems, which are important considerations in estimating the bioavailability of TEs in marine and estuarine waters. In the assessment of TEs in marine and estuarine systems, the omission of natural background concentrations of TEs and NOM/DOC can lead to the over-estimation of risk, especially in areas with high natural background levels of TEs or high NOM/DOC. In local and regional risk assessments, this can lead to the conclusion of risk in marine and estuarine systems with naturally high background levels of TEs. As such, the incorporation of natural background TE and NOM/DOC concentrations is an important consideration in the risk assessment and standard setting process. To this end, a project to develop approaches for determining background concentrations of trace elements in estuarine and marine waters was contracted with Dr. C. Hunt of Battelle Memorial Institute in 2009. A contractual disagreement developed in Q3 2010 between Battelle and the International Copper Association (ICA), which is managing the project on behalf of other ETAP sponsors. Ultimately the project with Battelle was cancelled. In Q4 2011, the project was contracted with Windward Environmental and a draft report was delivered in October of 2012. The report underwent review by two independent reviewers and recommendations for revisions were provided. Revisions were incorporated into the final report.</p> <p><i>Review and Evaluation of Dietary Metals Toxicity</i> At the 2011 ETAP meeting, a discussion took place on the current state of the science on the ecotoxicological consequences of dietborne metals exposure. It became clear that a number of publications have emerged since the completion of the 2001 Pellston Workshop on dietborne metals exposure and toxicity, and the publication of the workshop proceedings in 2005. Because the issue of dietborne exposure and toxicity are continuously raised in regulatory meetings, ETAP sponsors agreed to seek a proposal for an up-to-date critical review on these issues. To this end, D. DeForest of Windward Environmental submitted a proposal to prepare an updated review of the understanding of dietary-metal toxicity. This effort consisted of two phases. The first phase developed a comprehensive database of dietary-metal toxicity data, and the second phase interpreted the expanded database to address the question of whether water quality criteria or guidelines (US and Canada) or PNEC derived criteria (Europe) for metals are under-protective because they do not explicitly account for the dietary-exposure pathway. A final report was received in 2012 and a manuscript based on the research was submitted to Integrated Environmental Assessment and Management in April of 2013.</p> <p><i>Eco-SSL Workshop</i> C. Schlegel (NiPERA) attended a workshop held in Sundance, Utah, USA on September 17-21 that evaluated existing methods and explored recent science on factors to consider when establishing appropriate remedial goals for levels of metals in soils. The impetus for the workshop was the misuse of US EPA's Ecological Soil Screening Levels (Eco-SSLs). Eco-SSLs are meant to indicate soil metal concentrations that will not pose risks to soil invertebrates or to wildlife following soil ingestion. In practice, however, Eco-SSLs are used by many regional and local regulatory agencies as clean-up goals. As they are based on conservative estimates, Eco-SSLs are low, and clean-up goals that are based on Eco-SSLs are often at or below regional background concentrations. The goal of the workshop was to evaluate available methods for quantifying exposure of soil associated metals to wildlife (e.g., birds and mammals) through soil and food consumption and to develop provide recommendations for the development of ecological soil cleanup values (Eco-SCVs) that are both practical and scientifically defensible. The attendees represented academia, consulting, regulatory (US EPA, Environment Canada), and industry sectors. Many of the refinements that were presented included soil risk assessment tools that were developed in the EU's Existing Substances Risk Assessment of nickel, including soil bioavailability modeling, incorporating bioavailability into terrestrial effects assessment, and refinement of secondary poisoning assessments. The immediate outcome of the workshop will be a series of peer-review publications in the journal Integrated Environmental Assessment and Management. It is believed that US EPA will then incorporate the recommendations of these papers into guidance for determining Eco-SCVs.</p>	

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<p data-bbox="224 353 480 385">2) Ongoing Projects</p> <p data-bbox="224 412 1447 534"><i>Metals Mixtures Modeling Evaluation Manuscripts.</i> Three manuscripts based on the outcome of the Metals Mixtures Modeling Evaluation are under development. The manuscripts will be thematic reviews and will address the following topics: introduction of objectives and data sets, approaches and application to data sets, challenge of data sets, validation, and lessons learned.</p> <p data-bbox="224 561 1447 981"><i>Terrestrial metal mixtures study</i> Environmental contamination is usually characterized by mixtures of metals as opposed to single metals. Therefore, one of the overwhelming issues facing the metals industries in the coming years will be managing metal mixture exposures in relevant environmental compartments. Recent regulatory focus on the effects of metals mixtures or "cocktail effects" emphasizes the need for data in these areas. A proposal for ETAP members to sponsor a project for the development of data to address the effects of metal mixtures to soil organisms is under consideration. The decision to address soils first is based on the interest and availability of a research group open to such work, and the possible availability of leveraged funding from the Canadian government to pursue this work. These data will help determine whether the combined effects of several trace elements are additive or whether they decrease the toxic effect by competing for the same site of toxic action (antagonistic). The research being proposed would help in deciding whether further research into the effects of metal mixtures is needed for the development of a multi-metal BLM. The results would also be useful to clarify the ratios of trace metals that are found in the field and as a guide to whether current toxicological data were collected under environmentally relevant conditions.</p> <p data-bbox="224 1008 1447 1187">Researchers from McGill University proposed a research program to address metal mixtures in soils for copper, zinc, and nickel. NiPERA, IZA, and ICA will co-sponsor this research. An NSERC Cooperative Research and Development Grant was submitted in March 2011, and an affirmative response was received in July 2011. A meeting was held among the ETAP sponsors and researchers from McGill University at the SETAC North America meeting in November 2011 to discuss experimental design issues. The testing began January 2012, and is scheduled to be completed by the end of 2013.</p> <p data-bbox="224 1215 1447 1453"><i>Towards Marine/Estuarine Biotic Ligand Models for Cu, Pb, Zn & Ni: Chemical & Biological Aspects</i> To build upon the implementation of bioavailability-based Environmental Quality Standards for freshwater systems, efforts are underway to develop the necessary tools for marine and estuarine bioavailability-based metal standards. To this end, ICA, ILZRO, IZA, and NiPERA agreed to sponsor a Collaborative Research and Development grant proposed by Scott Smith (Wilfrid Laurier University, Waterloo, Ontario, Canada) and co-workers. The broad goal of this project is to establish the geochemical and biological building blocks that are necessary to develop bioavailability normalization approaches for marine and estuarine waters.</p> <p data-bbox="224 1481 1447 1544">The project includes several metals. Specifically addressing the work on Ni, considerable effort has been directed on the following areas:</p> <ul data-bbox="274 1572 1447 1702" style="list-style-type: none"> • Evaluation of fluorescence quenching for determining the speciation of Ni in marine waters, • Critical review of competitive ligand techniques for determining Ni-DOC binding in marine waters, • Characterization of Ni toxicity to invertebrates as a function of salinity; and, • Exploration of physiological mechanisms of Ni toxicity to sea urchins. <p data-bbox="224 1730 1447 1879">A meeting was held in the margins of the SETAC North America meeting in November 2011 to discuss details of this work with the research team, and to discuss the way in which the different aspects of the work will be integrated into a model that addresses speciation and toxicity of Ni to marine and estuarine organisms. Several teleconferences and a face-to-face meeting were held in 2012. The project is scheduled to run over a four year period and to be completed by the end of 2014.</p>	

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<p><i>Experiments Measuring Bioavailability in Oxidic and Spiked Sediments (EMBOSS)</i> At the 2011 ETAP meeting, ETAP Sponsors and Panel members discussed ways in which the current paradigm for predicting metal toxicity to sediment organisms can be improved. The current acid volatile sulfide (AVS), simultaneously extracted metals (SEM), and organic carbon (OC) approach to predicting sediment metal bioavailability has been mainly applied to anoxic sediments. Therefore, for ecosystems with oxic sediments or seasonal fluctuations in redox and AVS, this model may not be appropriate and is open to criticism. This further raises uncertainties when setting environmental quality standards (EQS) in these ecosystems with either seasonal or permanent oxic sediments. It has been shown that in oxic sediments Fe/Mn oxides and oxyhydroxides scavenge metals, and we have demonstrated their importance in predicting benthic macroinvertebrate community effects. Finally, most experimental testing with sediments (both in the field and laboratory) to establish EQS are based on metal spiking (dosing) studies of sediments. Recent advances in spiking methods have improved retention of metals, yet laboratory-amended sediments still show accentuated bioavailability with rapid flux of labile fractions due to metal partitioning that is not representative of natural sediments. Therefore, setting standards based on tests of laboratory-amended sediments in anoxic conditions may overestimate risk and result in EQS that are too low.</p> <p>A proposal was submitted to the ETAP sponsors by A. Burton (U. Michigan) and co-workers. The proposal seeks to improve predictions of metal bioavailability by accounting for oxic sediments and artificial spiking procedures. The specific goals of the research are as follows:</p> <ul style="list-style-type: none"> • Improve the (SEM-AVS)/fOC based models for determining whether metals may be toxic in sediments by incorporating an oxic partitioning component. Develop an empirical model that includes binding by Fe- and Mn-oxides, which appear to be important in binding of metals under oxic conditions. • Develop a spiking correction model for converting the partitioning of spiked metals to metal contaminated sediments that have been aged in the field through diagenesis. <p>Several ETAP sponsors indicated support for the project, including NiPERA, Rio Tinto, ICA, IMoA and IZA. Tentative support was offered by CDI and a new ETAP sponsor, the Vanadium consortium. The research began in 2012 and Part 1 was completed in 2013. A teleconference with researchers was held in March, 2013. Part 2, including sediment testing with Nickel, is scheduled to begin in July, 2013.</p> <p>3) New Projects Under Consideration</p> <p><i>Expansion of the Unit World Model</i> A breakout session during the 2012 ETAP meeting identified a lack of information for flowing systems on critical parameters affecting metal removal and a need for a sensitivity analysis. In response to this, Mutch Associates, LLC (Mutch Associates) provided a proposal and cost estimate for conducting a literature review to determine the critical parameter affecting metal removal in flow systems (i.e., rivers and streams) and to revise the Ticket UWM to run batch simulations to use for a sensitivity analysis simulations. The proposal is under review and a decision will be made in May 2013.</p> <p>2012 ETAP Meeting</p> <p>E. Garman and C. Schlekut attended the Ecotoxicity Technical Advisory Panel (ETAP) Meeting in Chicago, IL, USA on July 30-August 1, 2012. The ETAP meeting focused on current and emerging science issues relevant to the metals industry. Other ETAP sponsoring organizations that were present included the Cobalt Development Institute, the International Copper Association, the International Lead Zinc Research Organization, and the International Zinc Association. The newest ETAP Panel Member, Dr. Kevin Farley of Manhattan College, was introduced and along with the other ETAP Panel Members (Ronny Blust, Allen Burton, Anne Fairbrother, Mike McLaughlin, and Peter Campbell) made presentations on many critical environmental issues. Issues of concern included: metal cycling in the aquatic environment, update on refinements and evaluations of the Unit World Model, discriminating between</p>	

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<p>natural and anthropogenic emissions, multicompartamental fate modeling of metals, use of Mid Infra-red spectroscopy to predict soil properties and in screening level assessments, and metal mixtures modeling. The panel members also made presentations on emerging issues expected to affect industry in the future. Finally, Drs. Aaron Packman and Jean-Francois Galliard of Northwestern University, and Dr. Tham Hoang of Loyola University Chicago were the invited as the guest speakers at this year's ETAP meeting and discussed issues of metals cycling and speciation in sediments, and environmental issues in Southeast Asia, respectively.</p> <p>Changes to the ETAP Sponsors</p> <p>In 2011, the Vanadium REACH consortium, represented by Vanitec, approached the ETAP coordinators with a proposal to become an ETAP sponsor. The proposal was supported by the remaining ETAP sponsors, and Vanitec officially began its sponsorship in 2012.</p>	