

EARTH EXPLORATION, INC. (NILES, MICHIGAN OFFICE)
RADIATION SAFETY PROGRAM & PORTABLE NUCLEAR GAUGE AUDIT
January 15, 2014

1. AUDIT HISTORY

Inquiry	Yes	No	Remarks
a. Last audit of this location completed on date <u>January 25, 2013</u>	X		12 th Audit. Physical audit made at Niles, MI office by RSO January 13, 2014. Audit activity occurred over several days there-after and completed January 15, 2014.
b. Were previous audits conducted yearly?	X		Yes, as of August 19, 2008.
c. Were records of previous audits maintained?	X		Yes. Audits maintained on PC and in hard copy form.
d. Were any deficiencies identified during last two audits or two years, whichever is longer?	X		No deficiencies noted by RSO.
e. Were corrective actions taken?			N/A

2. ORGANIZATION AND SCOPE OF PROGRAM

Inquiry	Yes	No	Remarks
a. If the mailing address or places of use changed, was the license amended?			No mailing or change of location of Niles, Michigan office.
b. If ownership changed or bankruptcy filed, was NRC prior consent obtained or was NRC notified?	x		License Amendment No. 10 received from NRC, dated April 5, 2013 re: change upon departure of S. Ludlow – former President of EEI). R. Olson now President and majority share holder.
c. If the RSO was changed, was license amended? Does new RSO meet NRC training requirements?			No RSO change.
d. If the designated contact person for NRC changed, was NRC notified?			No contact change at Niles, Michigan office.
e. Does the license authorize all of the NRC-regulated radionuclides contained in gauges possessed?	X		
f-1. Are the gauges as described in the Sealed Source and Device (SSD) Registration Certificate or Sheet? Have copies of (or access to) SSD Certificates?	X		
f-2. Have manufacturer's manuals for operation and maintenance?	X		
g. Are the actual uses of gauges consistent with the authorized uses listed on the license?	X		
h. Is RSO fulfilling his duties?	X		

3. TRAINING AND INSTRUCTIONS TO WORKERS

Inquiry	Yes	No	Remarks
a-1. Were all workers who are likely to exceed 100 mrem/yr instructed per [10 CFR 19.12]?	X		Exposure history of employees has not exceeded 100 mrem/yr.
a-2. Refresher training provided as needed [10 CFR 19.12]?	X		
b. Did each gauge operator attend an approved course prior to using gauges?	X		Either attended course or trained on-line. On-line trainees provided with field training by J. McAllister, Asst. RSO.
c. Are training records maintained for each gauge operator?	X		
d. Did interviews with operators reveal that they know the emergency procedures?	X		Updates with operators performed on a periodic basis throughout the year and at audit times.
e. Did this audit include observations of operators using the gauge in a field situation? Operating gauge?		X	Periodic observations made throughout year by J. McAllister, Asst. RSO.
f-1. Performing routine cleaning and lubrication?	X		Routine lubrication, cleaning, and daily observations of transporting gauges by operators performed by J. McAllister, Asst RSO and discussed w/gauge operators by RSO.
f-2. Transporting gauge?	X		
f-3. Storing gauge?	X		
g. Did the operator demonstrate safe handling and security during transportation, use and storage?			See above,
h. HAZMAT training provided as required? [49 CFR 172.700, 49 CFR 172.701, CFR 172.702, 49 CFR 172.703, 49 CFR 172.704]	X		Hazmat training current for gauge operators.

4. RADIATION SURVEY INSTRUMENTS

Inquiry	Yes	No	Remarks
a. If the licensee possesses its own survey meter, does it meet the NRC's criteria?	X		EEI (Niles office) possesses a calibrated TroxAlert survey meter, Serial #315.
b. If the licensee does not possess a survey meter, are specific plans made to have one available?			N/A
c. Is the survey meter needed for non-routine maintenance calibrated as required [10 CFR 20.1501]?	X		No non-routine maintenance performed by EEI. This service provided by InstruTek of Grand Rapids, Michigan. Survey meter calibrated yearly by Troxler Electronic Laboratories, Inc.
d. Are calibration records maintained [10 CFR 20.2103(a)]?	X		

5. GAUGE INVENTORY

Inquiry	Yes	No	Remarks
a. Is a record kept showing the receipt of each gauge? [10 CFR 30.51(a)(1)]	X		
b. Are all gauges received physically inventoried every six (6) months?	X		Physical inventories have been performed every 6-months as required. Last PI for gauges performed January 9, 2014.
c. Are records of inventory results with appropriate information maintained?	X		

6. PERSONNEL RADIATION PROTECTION

Inquiry	Yes	No	Remarks
a. Are ALARA considerations incorporated into the radiation protection program? [10 CFR 20.1101(b)]	X		ALARA philosophy in-place. RSO observed operators properly wearing dosimeters when required.
b. Is documentation kept showing that unmonitored users receive $\leq 10\%$ of limit? [10 CFR 20.1502(a)]	X		Surveys made and public dose calculations performed, and area badge implemented to confirm $< 10\%$ of limit.
c. Did unmonitored users' activities change during the year which could put them over 10% of limit?		X	
d. If yes to c. above, was a new evaluation performed?			N/A
e. Is external dosimetry required (user receiving $> 10\%$ of limit)? And is dosimetry provided to users?	X		<p>Dosimetry testing has been performed as required.</p> <p>Reviewed, signed and dated by RSO. Also reviewed by senior management.</p> <p>N/A. No pregnant employees working with gauges.</p>
1) Is the dosimetry supplier NVLAP approved? [10 CFR 20.1501(c)]	X		
2) Are the dosimeters exchanged quarterly for film badges and at industry recommended frequency for TLDs?	X		
3) Are dosimetry reports reviewed by the RSO when they are received?	X		
4) Are the records NRC Forms or equivalent? [10 CFR 20.2104(d), 10 CFR 20.2106(c)]	X		
• NRC-4 "Cumulative Occupational Exposure History" completed?	X		
• NRC-5 "Occupational Exposure Record for a Monitoring Period" completed?	X		
5) If a worker declared her pregnancy, did licensee comply with 10 CFR 20.1208?			
• Were records kept of embryo fetus dose per 10 CFR 20.2106(e)?			
f. Are records of exposures, surveys, monitoring and evaluations maintained [10 CFR 20.2102, 10 CFR 20.2103, 10 CFR 20.2106]?	X		

7. PUBLIC DOSE

Inquiry	Yes	No	Remarks
a. Are gauges stored in a manner to keep doses below 100 mrem in a year? [10 CFR 20.1301(a)(1)]	X		
b. Has a survey or evaluation been performed per 10 CFR 20.1501(a)? Have there been any additions or changes to the storage, security or use of surrounding areas that would necessitate a new survey or evaluation?	X	X	Workers wear dosimeters when working in north section of soil lab (part time work location) and concrete lab (part-time work location). Results of dosimeter reports throughout year indicate exposure < 100 mrem/year.
c. Do unrestricted area radiation levels exceed 2 mrem in any one (1) hour? 10 CFR 20.1301(a)(2)]		X	
d. Are gauges being stored in a manner that would prevent unauthorized use or removal? [10 CFR 20.1801]	X		
e. Records maintained? [10 CFR 20.2103, 10 CFR 20.2107]	X		

8. OPERATING AND EMERGENCY PROCEDURES

Inquiry	Yes	No	Remarks
a. Have operating and emergency procedures been developed?	X		
b. Do they contain the required elements?	X		
c. Does each operator have a current copy (telephone numbers) of the operating and	X		
d. emergency procedures?	X		
e. Did any emergencies occur? If so, and were they handled properly by operator? Were appropriate corrective actions taken?		X	

9. LEAK TESTS

Inquiry	Yes	No	Remarks
a. Was each sealed source leak tested every 6 months or at other prescribed intervals?	X		Leak tests performed as required and results in individual gauge files. RSO reviews and signs test results. Senior management also reviews results.
b. Was the leak test performed as described in correspondence with NRC and according to the license?	X		
c. Are records of results retained with the appropriate information included?	X		Leak test results on file in individual gauge files.
d. Were any sources found leaking and if yes, was NRC notified?		X	All test results $\leq 185 \text{ Bq (0.005 uCi)}$.

10. MAINTENANCE OF GAUGES

Inquiry	Yes	No	Remarks
a. Are manufacturer's procedures followed for routine cleaning and lubrication of gauge?	X		
b. Does the source or source rod remain attached to the gauge during cleaning?	X		No non-routine maintenance performed by EEI
c. Is non-routine maintenance performed where the source or source rod is detached from the gauge? If yes, was it performed according to license requirements (e.g., extent of work, individuals performing the work, procedures, dosimetry, survey instrument, compliance with 10 CFR 20.1301 limits)?		X	No non-routine maintenance performed by EEI. If necessary, this type of service provided by InstroTek of Grand Rapids, Michigan.

11. TRANSPORTATION

Inquiry	Yes	No	Remarks
a. DOT-7A or other authorized packages used? [49 CFR 173.415, 49 CFR 173.416(b)]	X		EEI continues security of portable gauges during transportation by using steel "jobsite" boxes to transport gauges. Steel box is bolted to the beds of the trucks used to transport gauges. 3 steel boxes at Niles office.

b. Package performance test records on file?	X		
c. Special form sources documentation? [49 CFR 173.476(a)]	X		Source certificates in both hard copy electronic files.
d. Package has 2 labels (ex. Yellow-II) with TI, Nuclide, Activity, and Hazard Class? [49 CFR 172.403, 49 CFR 173.441]	X		On going maintenance or replacement of labels performed as necessary.
e. Package properly marked? [49 CFR 172.301, 49 CFR 172.304, 49 CFR 172.310, 49 CFR 172.324]	X		
f. Package closed and sealed during transport? [49 CFR 173.475(f)]	X		
g. Shipping papers prepared and used? [49 CFR 172.200(a)]	X		
h. Shipping papers contain proper entries? (Shipping name, Hazard Class, Identification Number (UN Number), Total Quantity, Package Type, :Nuclide, RQ, Radioactive Material, Physical and Chemical Form, Activity, category of label, TI, Shipper's Name, Certification and Signature, Emergency Response Phone Number, Cargo Aircraft Only (if applicable)) [49 CFR 172.200, 49 CFR 172.201, 49 CFR 172.202, 49 CFR 172.203, 49 CFR 172.204, 49 CFR 172.604]	X		
i. Shipping papers within drivers reach and readily accessible during transport? [49 CFR 177.817 (e)]	X		
j. Secured against movement? [49 CFR 177.834]	X		Steel locking "jobsite" box bolted to bed of pickup truck prevents any movement.
k. Placarded on vehicle, if needed? [49 CFR 172.604]			N/A
l. Proper overpacks, if used? [49 CFR 173.26]			N/A
m. Any incidents reported to DOT? [49 CFR 171.15, 16]		X	

12. AUDITOR'S INDEPENDENT SURVEY MEASUREMENTS (IF MADE)

Inquiry	Yes	No	Remarks
a. Describe the type, location and results of measurements. Do any radiation levels exceed regulatory limits?		X	Based on survey with TroxAlert survey meter 1-13-14, areas within 25 ft of gauge storage room indicated no excess levels of radiation.

13. NOTIFICATION AND REPORTS

Inquiry	Yes	No	Remarks
a. Was any radioactive material lost or stolen? Were reports made? [10 CFR 20.2201, 10 CFR 30.50]		X	
b. Did any reportable incidents occur? Were reports made? [10 CFR 20.2202, 10 CFR 30.50]		X	
c. Did any overexposures and high radiation levels occur? Reported? [10 CFR 20.2203, 10 CFR 30.50]		X	
d. If any events (as described in items a through c above) did occur, what was root cause? Were corrective actions appropriate?		X	
e. Is the licensee aware of telephone number for NRC Emergency Operations Center? [(301) 816-5100]	X		Posting on Bulletin Board.

14. POSTING AND LABELING

Inquiry	Yes	No	Remarks
a. NRC-3 "Notice to Workers" posted? [10 CFR 19.11]	X		
b. NRC regs., license documents posted or a notice posted? [10 CFR 19.11, 10 CFR 21.6]	X		
c. Other posting and labeling? [10 CFR 20.1902, 10 CFR 20-1904]	X		

15. RECORD KEEPING FOR DECOMMISSIONING

Inquiry	Yes	No	Remarks
a. Records kept of information important to decommissioning? [10 CFR 30.35(g)]	X		
b. Records include all information outlined in [10 CFR 30.35(g)]?	X		

16. BULLETINS AND INFORMATION NOTICES

Inquiry	Yes	No	Remarks
a. NRC Bulletins, NRC Information Notices, NMSS Newsletters, received?	X		All correspondence from NRC maintained in files at Indianapolis office.
b. Appropriate training and action taken in response?			None required in 2013.

17. SPECIAL LICENSE CONDITIONS OR ISSUES

Inquiry	Yes	No	Remarks
a. Did auditor review special license conditions or other issues (e.g., non-routine maintenance)?			N/A

18. DEFICIENCIES IDENTIFIED IN AUDIT; CORRECTIVE ACTIONS

Inquiry	Yes	No	Remarks
a. Summarize problems/deficiencies identified during audit.			No deficiencies noted for 2014 audit.
b. If problems/deficiencies identified in this audit, describe corrective actions planned or taken. Are corrective actions planned or taken at ALL licensed locations (not just location audited)?			N/A
c. Provide any other recommendations for improvement.			Overall radiation safety program has been administered effectively at Niles, Michigan office.

19.EVALUATION OF OTHER FACTORS

Inquiry	Yes	No	Remarks
a. Senior licensee management is appropriately involved with the radiation protection program and/or Radiation Safety Officer (RSO) oversight?	X		Management involvement with RSP continues. Quarterly, bi-yearly and yearly correspondence as a means of checks and balances continues between management and RSO. This includes the requirements of a Confirmatory Order (CO) as a result of the Alternative Dispute Resolution (ADR) with the NRC, August 2009. The CO requires special activities and correspondence with the NRC by EEI over the course of the last five years, ending 2014. These activities and correspondence are required of both management and the RSO. To-date, all requirements of the CO has been met by EEI.
b. RSO has sufficient time to perform his/her radiation safety duties?	X		
c. Licensee has sufficient staff to support the radiation protection program?	X		

Audit performed by Christopher S. Loyd, RSO

Route To: RO RDO KM KPM