

CARDINAL SURVEYS COMPANY

Radiation Protection Program Summary

Radiation Protection Program Review

Checklist

Rev. 3/2015

In accordance with the following regulatory authorities each licensee shall develop, document, and implement a radiation protection program sufficient to ensure compliance with the provisions of the regulations, and shall conduct and document an annual review of the RPP. The purpose of this document is to summarize the RPP for Cardinal Surveys Company and to provide a checklist for the purposes of documenting audits and reviews of the RPP. TAC Rule 289.202 (e) (3) requires an annual review.

I. REGULATORY AUTHORITIES

A. FEDERAL DEPARTMENT OF TRANSPORTATION (DOT)

Code of Federal Regulation (CFR) 49
Parts 100 - 199 and 390 - 399

B. TEXAS DEPARTMENT OF HEALTH

Texas Administrative Code - Title 25 - Part 1 - Chapter 289 - Subchapters D, F
Rules 289.201, 202, 204, 204, 205, 252, 253, 257

C. STATE OF NEW MEXICO ENVIRONMENTAL IMPROVEMENT BOARD

NMAC – 20.3.1, 20.3.3 , 20.3.4, 20.3.10, 20.3.12, 20.3.16

Title 20 Chapter 3 Part 1, 3,4,10,12 & 16
(5-3-95;20.3.3.2 NMAC – RN, 20 NMAC 3.1.3.300.A, 04-15-2004)

II. RADIOACTIVE MATERIAL LICENSES

A. STATE OF TEXAS

License Number: L00065
Issue Date: April 17, 1963
Application Date: Aug. 7, 2011
 Expiration Date: Oct. 31, 2021

B. STATE OF NEW MEXICO

License Number: WL040-14
Issue Date: Oct. 29, 1965
Application Date: Jan. 20, 2010
 Expiration Date: Mar. 31, 2015

III. RADIATION PROGRAM MANAGEMENT

A. RADIATION SAFETY COMMITTEE (RSC):

| | |
|------------------|-------------------------|
| J.S. McLaughlin | President, RSO |
| Darrell Norris | Sales & Operations Mgr. |
| Jason D. Norris | Assistant RSO |
| Annette Davidson | Administrative Mgr. |

The Radiation Safety Committee is the governing body for Cardinal Surveys Company and is designed to establish the safety procedures and safety programs to ensure that all personnel handle radioactive material safely.

IV. RADIATION TRAINING PROGRAM

A. AUTHORIZED TRAINING PROGRAMS

Authorized training programs are utilized for qualifying newly hired personnel for handling radioactive material.

B. IN-HOUSE TRAINING PROGRAMS

In-house training programs are utilized to ensure all personnel associated with radioactive materials are kept current and up to date with current practices and procedures. The in-house Training Program is under the direction of the President, Technical and Development Manager (RSO).

V. PERMANENT FACILITIES

A. LABORATORY

The company has constructed and operates a laboratory at the Odessa facility site. The lab is environmentally isolated including separate sewer system and filtered effluent air. The lab is used for shipping and receiving material shipments and for quality control and assurance. Exposure records are filed at the lab or in the administrative offices. Below ground bunkers and shielded waste disposal containers are used for storage of material. The area is double fenced and locked.

B. WASTE STORAGE/DECAY AREA

The company is authorized to dispose of radioactive waste material in on-site radioactive waste decay area. The waste decay area is monitored and secured. Waste consists of unused RAM and related materials. Currently, the waste storage and decay area is empty.

VI. TAGMASTER[®] - HIGH PRESSURE TAGGING SYSTEM

A. TAGMASTER[®] PATENT

Radioactive material high pressure injection system developed by Cardinal Surveys Company (U.S. Patent number 4,199,680).

B. AUTHORIZATION

Authorized By: State of Texas March 31, 1978
State of New Mexico (Agreement)

VII. TRANSPORTATION OF RADIOACTIVE MATERIAL

A. PACKAGING AND SHIPMENT REQUIREMENTS.

CFR 49 Parts 173.391 - 173.396

NMAC 20.3.12.1204 Limits on levels of radiation: Sources of radiation shall be used, store and transported in such a manner that the transportation requirements of 20.3.3.325 NMAC and the dose limitation requirements of Part 4 (20.3.4 NMAC) are met.
(5-3-95; 20.3.12.1204 NMAC – Rn, 20 NMAC 3.1.12.1204,04/15/2004)

NMAC 20.3.12.1205 Storage Precautions: (A) Each source of radiation, except accelerators, shall be provided with a storage or transport container. The container shall be provided with a lock or tamper seal for calibration sources to prevent unauthorized removal of, or exposure to, the source of radiation. (B) Sources of radiation shall be stored in a manner, which will minimize danger from explosion or fire. (5-3-95;20.3.12.1205 NMAC – Rn, 20 NMAC 3.1.12.1205, 04/15/2004)

NMAC 20.3.12.1206 Transportation Precautions: Transport containers shall be physically secure to the transporting vehicle to prevent accidental loss, tampering or unauthorized removal.
(5-3-95;20.3.12.1206 NMAC – rn,20 NMAC 3.1.12.1206, 04/15/2004)

TAC 289.257 (d) (25) (B) Type A package requirements (49 CFR 173.410 and 173.412)

TAC 289.257 (e) Transportation of radioactive material. (1) (A) Packaging 49 CFR 173: Subparts A, B, I. (B) Marking and labeling 49 CFR Part 172: Subpart D, §§172.400-172.407, §§172.436-172.440, and Subpart E. (C) Placarding--49 CFR Part 172: Subpart F, especially §§172.500-172.519, §172.556, and Appendices B and C. (D) Accident reporting--49 CFR Part 171: §171.15 and §171.16. (E) Shipping papers and emergency information--49 CFR Part 172: Subparts C and G. (F) Hazardous material employee training--49 CFR Part 172: Subpart H. (G) Hazardous material shipper/carrier registration--49 CFR Part 107: Subpart G.

TAC 289.257 (h) Routine determinations. Before each shipment, ensure package: (1) proper package, (2) package physical condition, (3) each closure device properly installed, secured, working, (4) bottle sealed, (6) the package has been loaded and closed in accordance with written procedures, (7) tie downs working, (8) external contamination rendered ALARA, (49 CFR 173.443), (9) external radiation levels below limits: (A) 200 mrem/hr, transport index below 10, or (B) transported by exclusive use shipment only, and levels below: 200 mrem/hr, unless in closed transport vehicle, secure, not unloaded until end, 200 mrem/hr at vehicle surface, 10 mrem/hr at 6.6 feet, 2 mrem/hr at occupied space unless personnel is wearing dosimetry. (10) temperature limits (11) other.

B. SHIPPING PAPERS.

CFR 49 Parts 172.200 - 172.203, 177.817

NMAC 20.3.12.1223 E. Shipping papers for the transportation of radioactive material.
(5-3-95; 20.3.12.1223 nmac – Rn, 20 NMAC 3.1.12.1223, 04/15/2004)

C. PLACARD - APPROPRIATE TYPE ON FOUR SIDES OF VEHICLE.

CFR 49 Parts 172.504, 172.519, 172.556, 177.823

D. TRANSPORT PRECAUTIONS - SECURE PACKAGE IN OR TO TRANSPORTING VEHICLE.

NMAC 20.3.12.1206 Transportation precautions: Transport containers shall be physically secure to the transporting vehicle to prevent accidental loss, tampering or unauthorized removal.
(5-3-95;20.3.12.1206 NMAC – Rn,20 NMAC 3.1.12.1206, 04/15/2004)

TAC 289.257(h)(9)(B)(i)(II) the package is secured within the vehicle so that its position remains fixed during transportation.

TAC 289.257 (d) (14) Exclusive use – consignee must ensure that any loading or unloading is performed by trained personnel.

E. VEHICLE SURVEY - RADIATION LEVELS OF DRIVER'S CAB AND EXTERIOR OF VEHICLE.

NMAC 20.3.12.1221 Radiation Surveys: A. Radiation surveys or calculations shall be made and recorded for each area where radioactive materials are used and stored. B. Radiation surveys shall be made and recorded for the radiation levels in occupied positions and on the exterior of each vehicle used to transport radioactive material. Such surveys shall include each source of radiation or combination of sources to be transported in the vehicle.
(5-3-95; 20.3.12.1221 NMAC – Rn,20 NMAC 3.1.12.1221, 04/15/2004)

TAC 289.257 (h) (9) and following.

F. QUALIFICATION OF DRIVER.

CFR 49 Part 391

G. DAILY DRIVER LOG - DAILY RECORD OF DUTY STATUS.

CFR 49 Part 395

H. RECORDS.

NMAC 20.3.12.1221 Radiation Surveys E. Records required pursuant to Subsections A through D of 20.3.12.1221 NMAC shall include the dates, the identification of individual(s) making the surveys, the identification of survey instrument(s) used, and an exact description of the location of the survey. Records of these surveys shall be maintained for inspection by the department for two years after completion of the survey.
(5-3-95;20.3.12.1221 NMAC – Rn,20 NMAC 3.1.12.12221, 04/15/2004)

NMAC 20.3.12.1222 Documents and records required at field stations: A Through J.
(5-3-95;20.3.12.1222 NMAC – Rn,20 NMAC 3.1.12.1222, 04/15/2004)

TAC 289.257 (k) Records. Three years. Identification, contents, date, addresses, surveys.

VIII. STORAGE, SECURITY AND INVENTORY

A. Records.

NMAC 20.3.12.1222 Documents and records required at field stations: A through J.
(5-3-95;20.3.12.1222 NMAC – Rn,20 NMAC 3.1.12.1222, 04/15/2004)

NMAC 20.3.12.1223 Documents and records required at temporary job sites: A through E.
(5-3-95;20.3.12.1223 NMAC – Rn,20 NMAC 3.1.12.1223, 04/15/2004)

TAC 289.201 (d) Records. (1) Records of receipt, transfer, and disposal. (2) Authenticated. (3) Legible.

B. Security and Storage.

NMAC 20.3.12.1217 Security
(5-3-95;20.3.12.1217 NMAC – Rn,20 NMAC 3.1.12.1217, 04/15/2004)

TAC 289.202 (y) Security and control – secure from unauthorized removal and access. Constant surveillance.

TAC 289.253 (f) Storage precautions. Storage container, locked and shielded. Rooms or areas posted. Sources downhole or in a bunker. Secured to prevent tampering or removal.

TAC 289.253 (n) Visual inspection of transport containers and injection tools every six months.

C. Signage and Posting.

TAC 289.202 (z) Signage.

TAC 289.202 (aa) Posting. CAUTION, RADIATION AREA.

D. Labeling Containers.

NMAC 20.3.12.1212 LABELING
(5-3-95;20.3.12.1212 NMAC – Rn,20 NMAC 3.1.12.1212, 04/15/2004)

TAC 289.202 (cc) Labeling containers. CAUTION, RADIOACTIVE MATERIAL. Isotope, date, activity, radiation levels. Defacement of labels.

TAC 289.253 (m) Labeling. Durable, legible, visible. Danger or caution, licensee's name, address, phone, isotope, activity and assay date.

E. Receiving packages.

TAC 289.202 (ee) Receiving packages. External contamination (wipes.) External limits for package and vehicle. Closed transport vehicle. Secured package. Company vehicles and public shipping.

F. Transportation precautions.

NMAC 20.3.12.1206 Transportation precautions: Transport containers shall be physically secure to the transporting vehicle to prevent accidental loss, tampering or unauthorized removal.
(5-3-95;20.3.12.1206 NMAC – Rn,20 NMAC 3.1.12.1206, 04/15/2004)

TAC 289.253 (g) Transport precautions. Containers locked and physically secure to vehicle to prevent shifting, loss, tampering or removal.

G. Inventory and Utilization.

TAC 289.253 (j) Quarterly inventory (monthly by practice.) Quantities, location, id, date, name.

TAC 289.253 (k) Utilization records. Identification of source, isotope, supervisor, location, date, amount.

H. Waste Management.

TAC 289.202 (ff) Waste management – approved decay area.

IX. PERSONNEL MONITORING, ALARA AND TRAINING

A. Doses and Limits

TAC 289.202 (f) Occupational dose limits for adults. Annual limits TEDE 5 rems. DDE 50 rems. Bioassays.

TAC 289.202 (j) Determine occupational doses. BRC 202-2, 3. Record of prior doses.

TAC 289.202 (n) Dose limits for individual members of the public not exceeded (0.1 rem).

B. Radiation levels.

TAC 289.202 (o) Radiation levels in unrestricted areas.

C. Monitoring.

TAC 289.202 (q) Monitors required for adults likely to receive 10% of annual limits.

TAC 289.202 (r) Proper location and use of individual monitoring devices. One per individual. Returned for proper processing and prevent deceptive exposures.

D. Respirators.

TAC 289.202 (w) Use of other controls – access, exposure times, respiratory protective equipment.

TAC 289.202 (x) Individual respiratory protection equipment – NIOSH, surveys and bioassays, fit testing, written procedures, policy statement.

E. Personnel Notification and Training.

NMAC 20.3.12.1214
(5-3-95;20.3.12.1214 NMAC – Rn,20 NMAC 3.1.12.1214, 04/15/2004)

TAC 289.203 (b) Posting of notices to workers. Requirements, license, operating procedures, notices of violation, BRC 203-1 (98), location of notices.

TAC 289.203 (c) Instructions to workers. Informed of storage, transfer and use. Instructed in health protection. Safety requirements. Responsibility. Exposure reports.

TAC 289.203 (d) Notifications and reports to individuals. Exposure data. Annual, on request, upon termination.

TAC 289.252 (ii) Training requirements. (List). Review with outside training supplier.

TAC 289.253 (o) Training requirements. Logging supervisor, 24 hour course. Two months OJT. Field evaluation. Logging assistant, safety and operational procedures, test, demonstrated competence. Annual ALARA review for supervisors and assistants.

TAC 289.253 (bb) Appendices. Training courses for logging supervisors and tracer studies.

X. RECORDS, SURVEYS AND TESTING

A. Surveys and Monitoring

NMAC 20.3.12.1207
(5-3-95;20.3.12.1207 NMAC – Rn,20 NMAC 3.1.12.1207, 04/15/2004)

NMAC 20.3.12.1216
(5-3-95;20.3.12.1216 NMAC – Rn,20 NMAC 3.1.12.1216, 04/15/2004)

TAC 289.202 (p) General surveys and monitoring. (2) Instruments operable and calibrated (12 months,) suitable, accurate.

TAC 289.253 (h) Survey instruments calibrated and operable for 0.1 mR/hr. Available at temporary job site. Six months calibration. Records maintained.

B. Records.

NMAC 20.3.12.1222
(5-3-95;20.3.12.1222 NMAC – Rn,20 NMAC 3.1.12.1222, 04/15/2004)

NMAC 20.3.12.1223
(5-3-95;20.3.12.1223 NMAC – Rn,20 NMAC 3.1.12.1223, 04/15/2004)

TAC 289.202 (ll) Records. Units (SI or special.) Manifests are SI. Identify survey instrument, location, individual, sources.

TAC 289.202 (mm) Record of RPP. Provisions and audits.

TAC 289.202 (nn) Records of surveys. Calibrations. Three year retention. Results, measurements and calculations. Bioassays.

TAC 289.202 (pp) Lifetime cumulative occupational radiation dose. Retention for duration of license.

TAC 289.202 (rr) Records of individual monitoring results. DDE, intake, CEDE, TODE, TDDE, CDO. BRC 202-2, 3. Lost monitoring devices and estimates.

C. RSO and RSC.

NMAC 20.3.12.1213
(5-3-95;20.3.12.1213 NMAC – Rn,20 NMAC 3.1.12.1213, 04/15/2004)

NMAC 20.3.12.1214
(5-3-95;20.3.12.1214 NMAC – Rn,20 NMAC 3.1.12.1214, 04/15/2004)

TAC 289.252 (f) RSO duties review.

TAC 289.252 (g) Radiation Safety Committee duties, meetings and minutes.

XI. EMERGENCY, SAFETY AND OPERATING PROCEDURES

A. Written procedures.

TAC 289.253 (p) Written operating, safety and emergency procedures.

B. Requirements.

NMAC 20.3.12.1215 Operating and Emergency Procedures
(5-3-95;20.3.12.1215 NMAC – Rn,20 NMAC 3.1.12.1215, 04/15/2004)

TAC 289.253 (bb) Appendices. (4) operating, safety and emergency procedures requirements. Handling of sources in uncased fresh water zones. Handling below exposure limits. Survey methods. Locking and securing sources. Personnel monitoring. Transportation, packaging and moving securely. Placarding. Accident procedures. Notification. Records. Logging tools. Handling open containers and packages. Decontamination. Waste storage and disposal. Labeling and posting.

XII. TEMPORARY JOB SITE

A. Definition.

TAC 289.253 (c) (14) Temporary job site - A location where well logging or tracer studies are performed other than the specific location(s) listed on a license or certificate of registration.

NMAC 20.3.12.7 K. Temporary job site – means a location where radioactive materials are present for the purpose of performing wireline services operations or tracer studies.

B. Survey Instruments.

NMAC 20.3.12.1207 Radiation Survey Instruments
(5-3-95;20.3.12.1207 NMAC – Rn,20 NMAC 3.1.12.1207, 04/15/2004)

TAC 289.253 (h) Survey instruments calibrated and operable for 0.1 mR/hr. Available at temporary job site. Six months calibration. Records maintained.

C. Personnel Monitoring.

NMAC 20.3.12.1216 Personnel Monitoring
(5-3-95;20.3.12.1216 NMAC – Rn,20 NMAC 3.1.12.1216, 04/15/2004)

TAC 289.253 (p) Personnel monitoring. Film badge required for supervisors and assistants at all times during logging service operations and/or tracer studies. One per individual, replaced monthly.

D. Security.

NMAC 20.3.12.1217 Security
(5-3-95;20.3.12.1217 NMAC – Rn,20 NMAC 3.1.12.1217, 04/15/2004)

TAC 289.253 (s) Security. Supervisor is responsible to protect restricted area.

E. Tracer Studies, Clothing, Equipment.

TAC 289.253 (u) Tracer studies. Appropriate clothing and equipment. Groundwater contamination.

F. Surveys.

TAC 289.253 (y) Radiation surveys recorded at each area of use. (Wellhead surveys.) Vehicle surveys.

NMAC 20.3.12.1207
(5-3-95;20.3.12.1207 NMAC – Rn,20 NMAC 3.1.12.1207, 04/15/2004)

NMAC 20.3.112.1221 (D)
(5-3-95;20.3.12.1221 NMAC – Rn,20 NMAC 3.1.12.1221, 04/15/2004)

G. Operating and Emergency Procedures.

NMAC 20.3.12.1215
(5-3-95;20.3.12.1215 NMAC – Rn,20 NMAC 3.1.12.1215, 04/15/2004)

G. Records.

TAC 289.253 (z) Records/documents for inspection at temporary job site. 289.253 (bb) (B) evidence of survey instrument calibration, (C) leak test (N/A), (I) Operating and emergency procedures manual, (K) location and well-head radiation surveys, (L) current license and (N) shipping papers for transportation of radioactive materials.

NMAC 203.12.1223
(5-3-95;20.3.12.1223 NMAC – Rn,20 NMAC 3.1.12.1223, 04/15/2004)

H. Training.

TAC 289.253 (bb) (2) Additional training: (A) sources of contamination; (B) contamination detection and control; (C) decontamination techniques and limits; (D) survey techniques for tracer materials; and (E) packaging requirements for transportation of radioactive materials, especially residual materials from tracer studies.

NMAC 20.3.12.1214
(5-3-95;20.3.12.1214 NMAC – Rn,20 NMAC 3.1.12.1214, 04/15/2004)

RPP Review: _____ (Signed)
James S. McLaughlin, RSO

_____ (Date)