



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
612 EAST LAMAR BLVD, SUITE 400
ARLINGTON, TEXAS 76011-4125

January 31, 2011

Roy Widmann
Project Manager
Tronox Worldwide, LLC
3301 NW 150th Street
Oklahoma City, OK 73134

SUBJECT: NRC INSPECTION REPORT 070-00925/10-001

Dear Mr. Widmann:

This refers to the inspection conducted on October 18-19, 2010, at your Cimarron Corporation site located near Crescent, Oklahoma. This inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel. The enclosed report presents the results of this inspection.

During the inspection, the NRC collected a number of groundwater samples that were analyzed by Oak Ridge Institute for Science and Education (ORISE) on behalf of the NRC. We received the sample results from ORISE on December 22, 2010. In addition, we received your split-sample results on December 27, 2010. We subsequently presented the final inspection results to your staff by telephone on January 27, 2011.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC's Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

Should you have any questions concerning this inspection, please contact Mr. Robert Evans, Senior Health Physicist, at (817) 860-8234 or the undersigned at (817) 860-8191.

Sincerely,

/RA/

D. Blair Spitzberg, PhD, Chief
Repository and Spent Fuel Safety Branch

Docket: 070-00925
License: SNM-928

Enclosure:

NRC Inspection Report 070-00925/10-001

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DNMS:RSFS	RSFS	C:RSFS		
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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket: 070-00925
License: SNM-928
Report: 070-00925/10-001
Licensee: Cimarron Corporation
Location: Crescent, Oklahoma
Dates: October 18-19, 2010
Inspectors: Robert Evans, PE, CHP, Senior Health Physicist
Repository and Spent Fuel Safety Branch
Accompanied By: Gerald Schlapper, CHP, PhD, Health Physicist
Repository and Spent Fuel Safety Branch
Approved by: D. Blair Spitzberg, PhD, Chief
Repository and Spent Fuel Safety Branch
Attachment: Supplemental Inspection Information

ENCLOSURE

EXECUTIVE SUMMARY

Cimarron Corporation
NRC Inspection Report 070-00925/10-001

This inspection was a routine, announced inspection of decommissioning activities being conducted at the Cimarron Corporation site. Overall, the licensee was conducting decommissioning activities in accordance with regulatory and license requirements.

Decommissioning Inspection for Materials Facilities/Management Organization and Controls

- The licensee maintained site staffing in accordance with license requirements, and the licensee had sufficient staff for the work in progress. The licensee implemented the performance-based license condition in accordance with license requirements. Finally, the licensee conducted routine audits and reviews in accordance with license requirements and regulations (Section 1).

Radiation Protection/Maintenance and Surveillance Testing

- The licensee implemented the radiation protection program in compliance with license and regulatory requirements (Section 2).

Environmental Protection

- The licensee had procedures and practices in place to effectively implement the environmental protection program at the site. All environmental samples were collected as required by the license. Contaminated groundwater continues to exist in the three areas previously identified by the licensee. The public dose assessment indicated that the exposures to the public resulting from site activities were well below the regulatory limit (Section 3).

Emergency Preparedness and Fire Protection

- Although not required by the license, the licensee maintained emergency response capabilities in accordance with its Health and Safety Plan (Section 4).

Transportation Activities, Radioactive Waste Management and Waste Generator Requirements

- The licensee had effectively implemented the license and regulatory requirements related to the management of radioactive wastes. Ambient gamma radiation levels at the site were essentially at background levels (Section 5).

Closeout Inspection and Survey

- Six groundwater samples were collected and split for analysis by both the NRC and the licensee. The licensee's sample results were comparable to the NRC's sample results. The groundwater analytical results from two locations exceeded the applicable release criteria. The licensee previously submitted a license amendment request to the NRC to change groundwater remediation methodologies, but the NRC had not approved the requested change by the end of the inspection period (Section 6).

Report Details

Summary of Site Status

The Cimarron facility permanently ceased operations during 1975. Facility decommissioning began in 1976 and continues in accordance with the NRC-approved decommissioning plan. The site is comprised of approximately 830 acres of land, with several buildings remaining from licensed operations. All four buildings have been decommissioned and released for unrestricted use. Final status surveys reports have been submitted for all portions of the site. Twelve of the 15 subareas have been released by the NRC for unrestricted use. The three remaining areas have not been released because the uranium concentrations in these areas exceed the site-specific release criteria. The three areas include Burial Area 1, Western Alluvial Area, and Western Upland Area. The licensee continues to monitor the groundwater in these three areas through annual groundwater sampling.

On January 12, 2009, Tronox Incorporated filed petitions for bankruptcy under Chapter 11 of the Bankruptcy Code. Tronox is the parent company of Cimarron Corporation. The licensee formally notified the NRC about the bankruptcy filing, and the NRC acknowledged the notification by letter dated February 11, 2009. At the time of the onsite inspection, Tronox continued to remain in bankruptcy.

By letter dated June 2, 2008, the licensee submitted a license amendment request to the NRC to change the groundwater remediation methodology from monitored natural attenuation to bioremediation. The NRC requested additional information about the proposed license amendment by letter dated November 12, 2009. However, by email dated February 26, 2010, the NRC suspended the review of the licensee's bioremediation proposal pending resolution of a bankruptcy settlement agreement with the U.S. Department of Justice. At the time of the onsite inspection, the NRC still had not approved the amendment request, in part, pending resolution of decommissioning funding and possible turnover of the site to a trustee.

1 Decommissioning Inspection for Materials Facilities/Management Organization and Controls (87104, 88005)

1.1 Inspection Scope

The inspectors reviewed management organization and controls to ensure that the licensee was conducting decommissioning activities in accordance with license requirements.

1.2 Observations and Findings

The Cimarron Corporation is owned by Tronox Worldwide LLC. Tronox Worldwide LLC is a wholly owned subsidiary of Tronox Incorporated. Tronox Worldwide LLC has contracted with Lucas Newman Science and Technologies, Inc (LNST) to provide most radiation safety services at the site.

The organizational structure is presented in Figure 3-1 of the Cimarron Radiation Protection Plan. All positions specified in the organization chart were staffed at the time of the inspection. The inspectors determined that the licensee had sufficient staff for the work in progress.

Since the previous inspection, Cimarron notified the NRC of two management level changes in the organization. By letter dated January 27, 2010, the licensee notified the NRC of a change in radiation safety officers (RSOs). The NRC subsequently approved the change by letter dated February 17, 2010. In addition, by letter dated February 23, 2010, the licensee notified the NRC of a change in site project managers.

Routine audits of the radiation protection program are required by 10 CFR 20.1101(c) and the Radiation Protection Plan. The licensee implemented these requirements through annual audits, periodic audits, and quarterly As Low as Reasonably Achievable (ALARA) committee meetings. The inspectors confirmed that the licensee had conducted these audits and that the ALARA committee had met quarterly. The ALARA committee reviewed periodic audits conducted by the RSO as well as any changes to the site Decommissioning Plan and Radiation Protection Plan as allowed by License Condition 27(e).

Quality assurance audits and/or surveillances are required by Section 5 of the Radiation Protection Plan. The licensee conducted two quality assurance surveillances and one audit of the groundwater sampling program during 2008. Additional audits were conducted through the ALARA committee during 2008-2009. Audit findings were appropriately identified, tracked, and corrected.

License Condition 27(e) allows the licensee to make certain changes to the Decommissioning Plan and Radiation Protection Plan without prior NRC approval. This condition also requires the licensee to submit annual reports to the NRC. The annual report includes changes the licensee has made in accordance with Condition 27(e). Since the previous inspection, the licensee submitted two annual reports to the NRC. The reports document several changes to the Radiation Protection Plan, but no changes to the Decommissioning Plan. The inspectors concluded that the changes to the Radiation Protection Plan were made in accordance with license requirements.

During January 2009, the licensee removed monitoring wells 1315R and 1316R from the Cimarron Radiation Protection Plan through the performance-based licensing process. These two wells are located in the vicinity of Burial Area 1. Simultaneously, the licensee added 12 wells including one well located near 1315R and 1316R. According to the licensee's representatives, these changes will enhance their understanding of contaminant flow and hydrology. The NRC staff agreed that the removal of two wells and the addition of 12 wells were improvements in the existing groundwater sampling program.

1.3 Conclusions

The licensee maintained site staffing in accordance with license requirements, and the licensee had sufficient staff for the work in progress. The licensee implemented the performance-based license condition in accordance with license requirements. Finally, the licensee conducted routine audits and reviews in accordance with license requirements and regulations.

2 Radiation Protection/Maintenance and Surveillance Testing (83822, 88025)

2.1 Inspection Scope

The inspectors examined the radiation protection program for consistency with license and regulatory requirements.

2.2 Observations and Findings

The radiation protection program requirements are specified in License Condition 26. Due to the limited occupational radiation exposure potential at the site, the licensee stopped issuing personnel dosimetry badges during 2008. The RSO stated that if conditions at the site changed, the licensee was prepared to order and re-issue appropriate dosimetry devices to personnel. In addition, based on current site conditions, there were no posted radiologically restricted areas at the site.

The licensee no longer conducted routine radiation, equipment release, and contamination surveys. Also, the licensee suspended all occupational air sampling. The last special work permit was issued during 2006. The RSO indicated that the licensee would conduct these actions if future activities dictated that special, non-routine surveys were required.

Individuals who entered the Cimarron facility owner controlled areas received initial training in site hazards and annual refresher training in radiation safety. The inspectors concluded that the level of training was appropriate for the radiation hazards present at the site, and the training complied with the requirements of 10 CFR Parts 19 and 20. The RSO provided training for all radiation workers. Training was conducted during April 2010 and followed a systematic approach with clear presentation of enabling and terminal objectives. Techniques utilized included oral classroom instruction, self-study training packages, calculations, and question and answer periods. Written examinations were administered to verify training adequacy. The inspectors reviewed training outlines, supporting materials, and examinations. Employees were examined and exceeded the minimum passing score of 80-percent.

Some tasks required that workers be trained in areas other than radiation protection. An example was entry into confined spaces. For these training requirements, self-study and online training modules supplied by local universities were utilized. Memos to file were used to document an individual's qualification to perform specific tasks.

According to the RSO, radiation survey instruments are no longer maintained onsite. If a radiation survey instrument was needed, calibrated equipment would be provided by the contractor (LSNT) supporting activities at the site.

The licensee no longer maintained radioactive material on site, so the licensee did not have to maintain security and control of radioactive material per 10 CFR 20.1801 or 20.1802. However, the licensee continued to monitor and maintain site control through implementation of the Radiation Protection Plan and site procedures. The licensee also continued to maintain site fences and gates, and the licensee continued to conducted routine site tours.

2.3 Conclusions

The licensee implemented the radiation protection program in compliance with license and regulatory requirements.

3 Environmental Protection (88045)

3.1 Inspection Scope

The inspectors reviewed the environmental protection program to evaluate the impact, if any, of site activities on the public and the local environment.

3.2 Observations and Findings

Section 15 of the Radiation Protection Plan provides the environmental monitoring requirements. The current program consists of surface and groundwater monitoring. The licensee significantly revised the sampling locations during 2008 through the performance-based licensing process. Currently, surface samples are collected at two locations at the Cimarron River, and groundwater samples are collected from 29 monitoring wells. The samples are collected annually and analyzed for gross alpha activity, gross beta activity, and uranium isotopes. The inspectors reviewed the sample results for 2008-2009. The sample results indicate that the three areas previously identified with contaminated groundwater continue to contain contaminated groundwater.

License Condition 27(b) specifies the release criteria for groundwater at the Cimarron site. The release criteria is 180 picocuries of uranium per liter of water (pCi/L). The 2009 sample results indicate that 11 of 29 monitoring wells contained water that exceeded the release criteria. The highest sample result continues to be obtained from monitoring well TMW09 located in Burial Area #1. The 2008 sample result was 3645 pCi/L, the 2009 sample result was 2566 pCi/L, and the 2010 sample result was 3884 pCi/L. These sample results appear to represent a relatively constant trend.

Section 15 of the Radiation Protection Plan was revised during 2008 to stipulate that the environmental monitoring sample results are required to be submitted to the NRC within 30 days of the completion of the data review. The licensee submitted the sample results to the NRC's project manager by email dated September 11, 2009, as required by the Radiation Protection Plan.

Due to the removal of all licensed material from the surface of the site, the licensee previously eliminated the use of thermoluminescent dosimeters to monitor ambient radiation levels. The licensee last monitored exposures to the public during 2002. At that time, the measured exposure was less than 10 percent of the limit specified in 10 CFR 20.1301(a). The inspectors concluded that site conditions had not significantly changed since 2002; therefore, the licensee's previous assessment was still valid.

3.3 Conclusions

The licensee had procedures and practices in place to effectively implement the environmental protection program at the site. All environmental samples were collected as required by the license. Contaminated groundwater continues to exist in the three areas previously identified by the licensee. The public dose assessment indicated that

the exposures to the public resulting from site activities were well below the regulatory limit.

4 Emergency Preparedness and Fire Protection (88050, 88055)

4.1 Inspection Scope

The inspectors reviewed the licensee's emergency plan and fire protection program.

4.2 Observations and Findings

The NRC suspended the requirement for an emergency plan since an emergency with significant offsite radiological consequences was no longer considered to be a credible event. However, the licensee's site Health and Safety Plan contains a section dealing with emergency planning and notifications. This plan was last revised during March 2009. The inspectors noted that the emergency telephone numbers were not always up to date. The licensee took immediate action to correct the emergency notification list. The inspectors also noted that the licensee provided annual health and safety training. Through discussion with personnel and review of records, the inspectors verified that personnel had been thoroughly briefed on the content of the emergency plan. Fire extinguishers were available as needed for emergency situations.

4.3 Conclusions

Although not required by the license, the licensee maintained emergency response capabilities in accordance with its Health and Safety Plan.

5 Transportation Activities, Radioactive Waste Management and Waste Generator Requirements (86740, 84850, 84900)

5.1 Inspection Scope

The inspector reviewed the radioactive waste management and transportation programs for compliance with license and regulatory requirements.

5.2 Observations and Findings

The inspectors conducted site tours to observe the condition of the facility. During site tours, the inspectors conducted radiological surveys and observed site fences and gates. Overall, the licensee continued to maintain site structures, fences and gates.

During the site tours, the inspectors noted that the Reservoir 3 dam appeared to be degraded due to erosion. The inspectors were concerned that the failure of this dam could have a hydrological impact on the groundwater plumes. Further, dam failure could result in restricted access to portions of the site. During the inspection, the licensee's representative stated that repairs were being contemplated. Immediately after the onsite inspection, the licensee repaired the dam and a nearby water channel by adding additional soil to the area, grading the channel, and adding concrete and gravel for erosion control. The licensee concluded that these repairs should minimize the potential for significant erosion in the future.

License Condition 23 allowed the licensee to bury up to 500,000 cubic feet of soil contaminated with low-enriched uranium. Condition 23(a) stated that the licensee shall periodically monitor the disposal area for subsidence, erosion, and status of the vegetative cover for at least five years, and promptly repair any problems noted. During the inspection, the inspectors toured the burial area. The license presented information that demonstrated that monitoring began during late-2001; therefore, the five year time frame specified in the license ended during late-2006. During the site tour, the surface features of the burial area appeared to be in good condition. No subsidence or erosion was observed, and the vegetative cover was being maintained over the burial area.

During site tours, the inspectors conducted radiation surveys with a Ludlum Model 19 micro-Roentgen survey meter (serial number 33537, calibration due date 8 April 2011). The inspectors measured the ambient gamma radiation exposure rates. Readings taken ranged from 8 to 12 micro-Roentgens per hour. Background levels measured in non-impacted areas of the site ranged from 8 to 9 micro-Roentgens per hour. In summary, ambient gamma exposure rates at the site were essentially at background levels.

The licensee had not shipped any radioactive material from the site since the last inspection; therefore, this program area was not inspected.

5.3 Conclusions

The licensee had effectively implemented the license and regulatory requirements related to the management of radioactive wastes. Ambient gamma radiation levels at the site were essentially at background levels.

6 **Closeout Inspection and Survey/Decommissioning Inspection for Materials Facilities (83890, 87104)**

6.1 Inspection Scope

The inspectors collected six groundwater samples for comparison to the total uranium release criteria specified in the license.

6.2 Observations and Findings

In accordance with the Cimarron Radiation Protection Plan, Section 15.3, the licensee collects groundwater samples on an annual basis from various locations around the site. License Condition 27(b) provides the release criteria for groundwater at the Cimarron site. The release criteria is 180 picocuries of total uranium per liter of water. As noted earlier, groundwater in three areas exceeds the site-specific release criteria.

The inspectors observed the collection of groundwater samples from various locations around the site. Six samples were split with the NRC. The inspectors compared the licensee's collection protocols to the guidance provided in ASTM D4448, "Standard Guide for Sampling Ground-Water Monitoring Wells," and instructions provided in site procedure CM-SAP-104, "Groundwater Sampling." The samplers measured water pH and specific conductivity in the field. The samples were filtered using the industry norm filter size of 0.45 microns. The samplers also maintained control of the samples through

use of chain of custody forms. The inspectors concluded that the samplers collected the samples in accordance with industry guidance and the site procedure.

The NRC's split samples were submitted to its contract laboratory, Oak Ridge Institute for Science and Education (ORISE), for analysis. The licensee submitted its split samples to an offsite contract laboratory for analysis. In addition, the licensee collected and analyzed duplicate samples for four of the six samples:

Cimarron Split Sample Results

Well Location	Total Uranium, pCi/L		
	NRC	Cimarron	Cimarron Duplicate
1354, Western Upland Area	2.44 ± 0.43	2.44 ± 0.43	
TMW09 Burial Area 1	3600 ± 290	3884 ± 149	3783 ± 153
02W43 Burial Area 1	144.4 ± 8.8	129.7 ± 8.14	172.9 ± 14.4
T64, Western Upland Area	69.2 ± 4.8	86.0 ± 5.84	
T76, Western Alluvial Area	229 ± 15	268 ± 16	191 ± 9.4
1201, River	3.99 ± 0.61	3.29 ± 0.52	2.23 ± 0.96

The sample results indicate that the groundwater in the vicinity of wells TMW09 and T76 exceeded the release criteria (180 pCi/L). These sample results were generally consistent with the 2009 sample results. Also, the split sample results suggest good comparison between the two laboratories.

The highest uranium concentration continues to be identified in samples collected from Well TMW09 in Burial Area 1. The 2008 sample result was 3645 pCi/L, while the 2009 sample result was 3671 pCi/L. The licensee's 2010 sample results were 3884 pCi/L and 3783 pCi/L. As noted earlier, the licensee has submitted a license amendment request to the NRC to change the decommissioning methodology from monitored natural attenuation to bioremediation. At the end of the onsite inspection, the NRC had not approved the change in remediation methodologies.

6.3 Conclusions

Six groundwater samples were collected and split for analysis by both the NRC and the licensee. The licensee's sample results were comparable to the NRC's sample results. The groundwater analytical results from two locations exceeded the applicable release criteria. The licensee previously submitted a license amendment request to the NRC to change groundwater remediation methodologies, but the NRC had not approved the requested change by the end of the inspection period.

7 Exit Meeting

The inspectors reviewed the scope and findings of the inspection during an exit meeting that was conducted at the conclusion of the onsite inspection on October 19, 2010. The inspector presented the final inspection findings to the licensee on January 27, 2011, following the receipt of the groundwater sample results from both ORISE and the licensee by December 27, 2010. During the inspection, the licensee did not identify any information reviewed by the inspectors as proprietary.

SUPPLEMENTAL INSPECTION INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Cimarron Corporation

Art Lucas, Consultant, LNST
Barbara Lucas, Quality Assurance Coordinator, LNST
Douglas Modder, Field Technician, Tronox Worldwide
Larry Morgan, Site Health Physics Technician, LNST
Harry Newman, Radiation Safety Officer, LNST
Roy Widmann, Project Manager, Tronox Worldwide

Oklahoma Department of Environmental Quality

David Cates, Professional Engineer, Land Protection Division

INSPECTION PROCEDURES USED

IP 87104	Decommissioning Inspection Procedure for Materials Facilities
IP 88005	Management Organization and Controls
IP 83822	Radiation Protection
IP 88025	Maintenance and Surveillance Testing
IP 88045	Environmental Protection
IP 88050	Emergency Preparedness
IP 88055	Fire Protection
IP 86740	Inspection of Transportation Activities
IP 84850	Radioactive Waste Management
IP 84900	Radioactive Waste Generator Requirements
IP 83890	Closeout Inspection and Survey

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

Discussed

None

LIST OF ACRONYMS

ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
IP	NRC Inspection Procedure
LNST	Lucas Newman Science and Technologies, Inc.
ORISE	Oak Ridge Institute for Science and Education
pCi/L	picocuries per liter
RSO	Radiation Safety Officer
URI	Unresolved Item