MWL 2/6/2007

ENTERED

STATE OF NEW MEXICO

BEFORE THE SECRETARY OF ENVIRONMENT

No. HWB 04-11(M)

IN THE MATTER OF A REQUEST FOR A)
CLASS 3 PERMIT MODIFICATION FOR CORRECTIVE)
MEASURES FOR THE MIXED WASTE LANDFILL)
SANDIA NATIONAL LABORATORIES, BERNALILLO)
COUNTY, NEW MEXICO, EPA ID NO. NM5890110518)

CITIZEN ACTION'S MOTION TO SECRETARY OF THE ENVIRONMENT AND HEARING OFFICER FOR RECONSIDERATION TO REOPEN PERMIT MODIFICATION PROCEEDINGS FOR TAKING OF NEW EVIDENCE

Citizen Action requests that the Secretary or Hearing Officer reopen the permit proceedings for the taking of new evidence regarding: 1) The existence of nickel and organic contamination at the Mixed Waste Landfill (MWL), and; 2) the necessity to provide compliance monitoring at the MWL with a well monitoring network that is compliant with the Resource Conservation and Recovery Act (RCRA).

I. NICKEL CONTAMINATION FROM THE MWL EXCEEDS NEW MEXICO DRINKING WATER STANDARD BY TWICE THE MAXIMUM CONTAMINANT LEVEL

The decision of the Hearing Officer in the above-captioned matter was in substantial portion based upon representations by the State of New Mexico representatives of the New Mexico Environment Department that contaminants were not in the ground water at the Mixed Waste Landfill. The attached affidavit of Robert Gilkeson, Registered Geologist demonstrates that there is contamination from nickel at the MWL. The nickel contamination was evident for many years but was incorrectly described as being due to the corrosion of the well screens. For reasons explained in the Affidavit, the nickel is not from well screen corrosion because the proportional amount of chromium is not present in the water samples.

The Annual Groundwater Monitoring Report for March 1997 found that the nickel level exceeded U.S. Environmental Protection Agency (EPA) Maximum Contaminant Levels and stated:

"In 1996, groundwater samples were collected from the five monitoring wells at the Mixed Waste Landfill (MWL) during April, in accordance with 40 CFR 264.101 Corrective Action for Solid Waste Management Units. Except for the detection of nickel (0.145 mg/L) in MWL-MW1, no analytes were detected at levels above U.S. Environmental Protection Agency (EPA) Maximum Contaminant Levels (MCLs) or U.S. Department of Energy (DOE) Derived Concentration Guides (DCGs)." (Emphasis supplied)." (AR 00861)

The dissolved nickel contamination at the MWL monitoring well, MWL-MW1, has increased for the 15-year period from 1990 to 2005 from 43 ug/L in 1990 to 405 ug/L in 2005. The RCRA Facility Investigation identified that nickel wastes were disposed of in the MWL and that "hot spots" of nickel contamination were present in the strata beneath the MWL. The New Mexico Water Quality Standard for nickel is that concentrations shall not exceed 200 ug/L. The EPA remanded the nickel drinking water standard Maximum Contaminant Level (MCL) of 100 ug/L on February 9, 1995, and has not issued a new MCL. Thus, the New Mexico Water Quality Standard is exceeded by twice the permissible level.

NMED, Sandia National Laboratories (SNL), and the Department of Energy (DOE) failed to report this contamination to the public and the Hearing Officer during these proceedings although the contamination was present for many years and increasing. The contamination was not predicted by the Fate and Transport Model and calls into question the accuracy of that model to predict contamination at the MWL.

In a document entitled *Evaluation of the Representativeness and Reliability of Groundwater Monitoring Well Data, Mixed Waste Landfill, Sandia National Laboratories* (NMED, November 2006) ("Evaluation") used to contrive NMED Responses to Citizen Comments after the above-captioned proceedings, it is stated that (p.7) "Although MW1 should provide sample data that are representative of background hydrochemistry in the AF [Alluvial Fan] facies, the concentration of total nickel in MW1 groundwater samples has shown a marked increase over time." The Evaluation was written after the hearing in this proceeding to address numerous legal and scientific concerns about the well monitoring system at MWL that have arisen subsequent to the hearing. The methodology used by the Evaluation has been rejected by the U.S. Environmental Protection Agency in two reviews of the monitoring well network at Los Alamos National Laboratories (LANL).

II. THE MWL WELL MONITORING NETWORK IS NOT COMPLIANT WITH RCRA SUBPART F REQUIREMENTS.

Although the NMED, Sandia National Laboratories (SNL), and the Department of Energy (DOE) presented well monitoring data for the period from 1990 to 2005 as being reliable and representative to the Hearing Officer, Citizen Action and the public, both NMED and SNL/DOE knew that the well monitoring network at the MWL did not provide reliable and representative water quality data. NMED and SNL/DOE both knew that the MWL well monitoring network did not meet the requirements contained in Resource Conservation and Recovery Act, the Consent Order of April 29, 2004 and/or the expired Environmental Protection Agency's Module IV for a well monitoring network.

Both NMED and SNL/DOE have known but did not inform the public or the Hearing

Officer that the monitoring well network at the MWL does not have a legally required upgradient background well and three down gradient wells capable of monitoring either the fine-grained sediments for early detection of contaminant release from the MWL or for monitoring the Ancestral Rio Grande strata (uppermost aquifer under RCRA).

Both NMED and SNL/DOE have known, but did not inform the public or the Hearing Officer that: the MWL monitoring wells were not developed properly; not in the proper locations; that well screens were across differing strata; that a packer was not installed and after installation contaminants continued to leak from beneath the dump into the uppermost aquifer; that organic drilling fluids and bentonite muds were used which adsorb contaminants of concern; that wells are going dry, and; that purge to dry sampling methods would also destroy contaminants of concern including volatile organic chemicals, heavy metals and radionuclides, including Greater than Class C Waste and transuranics.

Numerous documents going as far back as 1991 contained in the Administrative Record reveal that the MWL groundwater monitoring system lacked the required monitoring system under RCRA Subpart F and/or for the 40 CFR 264.101 Corrective Action proposed by the NMED and SNL. Numerous documents of both NMED and SNL acknowledge that for numerous reasons, the "well monitoring system is inadequate." (See e.g., AR 006224, 006521, 009173, 010981, 010984-10986,). These voluminous documents and records regarding the MWL and its monitoring system were not publicly available to Citizen Action, other public participants or the Hearing Officer previous to the hearing in this matter. Nevertheless, NMED and SNL presented information they knew to be unreliable and misrepresentative regarding the failure of the well monitoring network at the MWL to be in compliance with RCRA mandated requirements for monitoring.

III. RELIANCE ON DEFECTIVE WELL MONITORING INFORMATION

The Hearing Officer relied on defective information regarding the adequacy and effective function of the existing monitoring system at the MWL for the decision to recommend that the development, disclosure and public comment on a long-term monitoring and maintenance plan be deferred until after approval of the detailed design of the Corrective Measure Implementation Plan. The Hearing Officer's recommendation was based on defective information, is not supported by evidence in the record and is contrary to evidence in the record that was incorporated into the Permit Modification issued by NMED for the MWL.

Both Citizen Action, the Hearing Officer and the public detrimentally relied upon those misrepresentations by NMED and SNL regarding the well monitoring network at the MWL. The result of this reliance by the Hearing Officer was to approve the remedy of a soil cover at the MWL without the knowledge that the well monitoring system at the MWL is not compliant with RCRA and also that there is evidence of nickel contamination which NMED and SNL knew and should have reported.

Therefore, in consideration of the above, Citizen Action New Mexico requests that the proceedings for the Mixed Waste Landfill be reopened for the taking of new evidence.

Respectfully submitted,

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AFFADAVIT OF ROBERT GILKESON, REGISTERED GEOLOGIST

I, Robert Gilkeson am a Registered Geologist. I am submitting the attached document entitled, Nickel Contamination in the Regional Aquifer From Nickel Wastes Buried in the Sandia Mixed Waste Landfill, Version January 23, 2007 by Robert H. Gilkeson, Registered Geologist rhgilkeson@aol.com , in support of **CITIZEN ACTION'S MOTION TO SECRETARY OF THE ENVIRONMENT AND HEARING OFFICER FOR RECONSIDERATION TO REOPEN PERMIT MODIFICATION PROCEEDINGS FOR TAKING OF NEW EVIDENCE IN THE MATTER OF A REQUEST FOR A CLASS 3 PERMIT MODIFICATION FOR CORRECTIVE MEASURES FOR THE MIXED WASTE LANDFILL SANDIA NATIONAL LABORATORIES, BERNALILLO COUNTY, NEW MEXICO, EPA ID NO. NM5890110518.**

If called upon to testify in a Court of Law or in the above Administrative Proceedings, I could competently testify to the information contained in the attached document as truthful and correct to the best of my knowledge.

Sworn to under penalty of perjury under the laws of the State of New Mexico,

Date: February 6, 2007

Location: 105 STANFORD, DLBU QUERQUE, NM 87196

Robert Gilkeson

Robert Gilkeson,
Registered Geologist

Nickel Contamination in the Regional Aquifer From Nickel Wastes Buried in the Sandia Mixed Waste Landfill, Version January 23, 2007

by Robert H. Gilkeson, Registered Geologist rhgilkeson@aol.com

The Moats report – *Evaluation of the Representativeness and Reliability of Groundwater Monitoring Well Data, Mixed Waste Landfill, Sandia National Laboratories* (NMED, November 2006), relies on the findings in Goering et al. (SAND 2002-4098) that the elevated nickel levels measured in well MW1 are due to corrosion of the stainless steel well screen. However, this finding in Goering et al. is technically incorrect and without basis to the water quality data collected over time from the well. In fact, the high dissolved nickel measured in water samples produced from well MW1 is because of the nickel wastes that are buried in the mixed waste landfill.

The nickel contamination measured in water samples produced from well MW1 are summarized below in Table 1. The location of well MW1 is shown on Figure 1. The Moats report does not acknowledge that nickel wastes were disposed of in the MWL. Page 4 of the Moats report describes the contaminants measured in boreholes drilled below the MWL as follows:

> "Based on analysis of soil samples from investigational boreholes as well as passive and active soil-gas surveys (SNL, 09/1996), detectable contaminant releases from the MWL are limited to low levels of tritium, radon, and volatile organic compounds in the vadose (*i.e.*, unsaturated) zone. Cadmium has been detected at low concentrations in the vadose zone, but only along the western boundary of the landfill."

In fact, the Moats report does not acknowledge the nickel contamination that was measured in boreholes drilled below the dump as shown by the concerns in the NMED 1998 Notice of Disapproval (NOD) for the *"Report of the Mixed Waste Landfill Phase 2 RCRA Facility Investigation."* The NMED NOD described the presence of elevated nickel concentrations to a depth of 100 ft below ground surface (bgs) and a "hot spot" of nickel contamination at a measured level of 97.5 mg/kg at a depth of 50 ft bgs in borehole BH-3. The NMED NOD made the following conclusion:

> "The presence of metal contaminants at depths which can exceed 100 ft indicates that liquid wastes were disposed of in the landfill. Thus, groundwater monitoring for metals is required."

The stainless steel screen in well MW1 is Type 304 stainless steel and is composed of 18% chromium and 8% nickel. Corrosion of the well screen will provide both chromium and nickel to the groundwater. However, the very high levels of dissolved nickel and very low levels of dissolved chromium are evidence that the nickel contamination is not from corrosion of the screen. The water quality data for well MW1 are presented below in Table 1 for the 15-year period from 1990 to 2005. Over this period, the dissolved nickel has increased from 43 ug/L in 1990 to 405 ug/L in 2005. The highest dissolved nickel value of 538 ug/L was in a water sample collected in 1998.

The dissolved chromium values are very low in well MW1. Dissolved values between 11 and 21 ug/L are reported for four water samples collected in 1991 but this data is uncertain because chromium was not detected (*i.e.*, < 10 ug/L) in the unfiltered water samples collected as splits of the filtered samples. For water samples collected over the period from 1997 to 2005, the dissolved chromium levels are very low with the highest value of 4.22 ug/L measured in a water sample collected in 1999. The most recent water sample analyzed for dissolved chromium was in 2000 with a measured estimated value of 2.39 ug/L compared to a measured value of 8.67 ug/L for chromium in an unfiltered split of the water sample. Note that for the April, 2005 sampling event, a very low estimated chromium level of 1.05 ug/L was measured in an unfiltered water sample compared to an unfiltered value of 411 ug/L for nickel and a filtered value of 405 ug/L for nickel.

The close comparison of nickel values in the unfiltered and filtered splits is evidence that the high dissolved nickel values are from buried wastes in the MWL. Corrosion would create finely divided particles of nickel and result in a markedly higher value for nickel in the unfiltered water sample.

The water quality data collected from well MW1 support the conclusion that the high dissolved nickel values are because of groundwater contamination by nickel wastes released from the Sandia Mixed Waste Landfill. The failure of the Moats report to identify the presence of nickel contamination in well MW1 is another example of the poor quality of the report.

The NMED has allowed Sandia to collect water samples from well MW1 with the inappropriate high-flow purging methods that pump the well dry with water samples collected a week later of the aerated water that refilled the well. At the time of construction, well MW1 was adequately productive to support a low-flow water sampling methodology as shown by the fact that the permeability of the screened interval was measured with a pumping test.

The 20-ft. screen in well MW1 is in the depth interval of 456 to 476 ft below ground surface (bgs). During the 2006 sampling event, the water level was measured at a depth of 467.62 ft bgs.

The borehole log describes the aquifer strata across the well screen as follows:
467 - 472 ft bgs GM – silty sandy gravel; predominantly fine gravel with a trace of clay.
472 – 479 ft bgs. SM – silty fine sand, trace clay.

The borehole log predicts the saturated strata across the screened interval have a capability to produce a continuous flow of water for low-flow purging and sampling. The 2006 field sampling log on file at NMED shows that the well was purged at a rate of 2.3 liters per minute, a purging rate 10 times faster than the rate recommended by EPA and NMED for low-flow sampling.

The purge to dry sampling methodology used for routine collection of water samples from well MW1 may be masking detection of other contaminants in the groundwater. It is important to use a low-flow sampling methodology for the collection of water samples from well MW1. In fact, it is very probable that the purge to dry sampling methodology has caused the formation of a new mineralogy in the strata surrounding the screened interval that have properties to mask the detection of contaminants in the groundwater produced from the well. In addition, the purge to dry sampling methods may have caused physical processes that have lowered the hydraulic conductivity (Ksat) of the screened interval. It may be necessary to perform well development procedures to improve the ability of the well to produce water for low-flow purging and sampling.

The damage caused to monitoring wells by high-flow purging is described on page 3 of the NMED Position Paper – *Use of Low-Flow and Other Non-Traditional Sampling Techniques for RCRA Compliant Groundwater Monitoring* (October, 2001):

> **"High Flow Rate Sampling:** Evacuation of water from the screened interval of a monitoring well at a rate that significantly exceeds natural flow through the screen (Barcelona, Wehrman, and Varljen, 1994) or the groundwater flow velocity for which the well was designed. High pumping rates of groundwater from the monitoring well may cause undue stress on the well screen or sand pack, shorten the usability and life span of the well, cause excessive turbidity, or may cause other damage to well construction."

Drinking Water Standards for Nickel. The New Mexico Water Quality Standard for nickel is that concentrations shall not exceed 200 ug/L. The EPA remanded the nickel drinking water standard Maximum Contaminant Level (MCL) of 100 ug/L on February 9, 1995, and has not issued a new MCL.

The nature and extent of nickel contamination in the groundwater below the mixed waste landfill is poorly understood at the present time because of the insufficient number of monitoring wells and the inappropriate methods that are used for the collection of water samples.

For water samples collected from the upper screen in monitoring well MW4, the NMED water quality data base lists anomalously high dissolved nickel values of 31.9 and 32.2 ug/L for splits of water samples collected on April 16, 2003. A much lower nickel value of 15.9 ug/L was measured in an unfiltered water sample collected on April 20, 2004, and an even lower value of 4.5 ug/L was measured in an unfiltered water sample collected from well MW4 on April 19, 2005.

An elevated nickel value of 69.4 ug/L was measured in an unfiltered water sample collected from well MW3 on April 22, 2003. The high turbidity of 11 NTUs measured in this water sample may be responsible for the high nickel value. For this sampling date, nickel was not analyzed for a filtered water sample. The overall poor quality of the groundwater monitoring data for the mixed waste landfill prevent knowledge of the danger of groundwater contamination now and in the future from the buried wastes.

Table 1. Constituents Measured in Water Samples From Well MWL-MW1

- Drill Method – Air Rotary Casing Hammer with no drilling fluids other than water
- Well has a Type 304 stainless steel screen

Sample [A] Date	Nickel [B] ug/L [E] U [H] / F [I]	Turbidity NTU [F] U	Chromium [C] ug/L U / F	Iron ug/L U / F	Zinc [D] ug/L U / F	Chloride mg/L [G] U	Nitrate mg/L U
- 09-90	46 / 43	NA [J]	ND [K] <10 / ND<10	NA	NA	31.0	NA
- 01-91	NA	NA	ND < 10 / 21	?	NA	29.9	NA
- 05-91	NA	NA	ND < 10 / 15	?	NA	NA	NA
- 07-91	NA	NA	ND < 10 / 11	?	NA	NA	NA
- 10-91	NA	NA	ND < 10 / 19	?	NA	28.2	5.5
- 07-92	150 / 63	NA	11 / ND < 10	?	21 / NA	NA	NA
- 01-93	78 / NA	NA	11 / NA	NA / 90	ND<20 / ND<20	NA	NA
- 04-93	97 / 94	NA	ND<10 / ND<10	118 / NA	11 / NA	31.0	5.5
- 11-93	95 / NA	NA	10 / NA	220 / NA	16 / 16	29.1	5.4
- 05-94	150 / NA	NA	ND < 10 / NA	110 / NA	17 / 17	NA	5.0
- 05-94	130 / NA	NA	ND < 10 / NA	48 / NA	16 / 16	NA	5.0
- 10-94	100 / NA	NA	ND < 10 / NA	58 / NA	28 / NA	30	5.2
-10-94	130 / NA	NA	ND < 10 / NA	ND < 100 / NA	24 / NA	NA	5.2
- 04-95	120 / NA	1.4	ND < 3 / NA	94 / NA	4.4 / 4.4	31.9	5.5
-10-95	107 / NA	7.2	42.8 / NA	565 / NA	6.73 / 6.73	29.5	NA
- 04-96	145 / NA	3.8	11.6 / NA	?	6.36 / 6.36	NA	5.2
- 04-97	NA	18.9	1,100 / NA	NA	NA	NA	5.2
-10-97	NA	4.9	47.4 / 1.94 (j) [L]	NA	NA	NA	5.1
-10-97	NA	NA	40.5 / 2.07 (j)	NA	NA	NA	5.1
- 04-98	398 / 538	7.1	326 / ND < 0.73	NA	NA	NA	5.4
- 04-98	500 / NA	NA	260 / NA	NA	NA	NA	5.4
-11-98	490 / 467	6.1	69.4 / 0.32 (j)	NA	NA	NA	5.4
- 04-99	266 / 313	6.8	63.4 / 4.22	583 / 111	ND<7.88 / NA	NA	5.2
- 04-00	279 / 281	3.2	8.67 / 2.39 (j)	960 / NA	ND< 46 / NA	NA	4.4
- 04-01	252 / NA	7.4	34.9 / NA	409 / NA	25.7 / NA	31.1	3.0
- 04-02	265 / NA	NA	17.6 / NA	272 / NA	58.7 / NA	31.2	4.8
- 04-03	374 / NA	3.4	14.1 / NA	464 / NA	NA	32.4	4.7
- 04-04	401 / NA	6.6	42 / NA	886 / NA	17 / NA	32.6	5.2
- 04-05	411 / 405	6.4	1.05 (j) / NA	697 / 135	11.1 / 5.13	32.3	3.2
- 04-06	NR [M]	14	NR	1,650 / NA	NR	NR	NR

[A] Values listed in the table are from DOE/SNL reports and data on file at the NMED.
[B] NMED recognizes a nickel concentration of 28 ug/L to be representative of natural background,
[C] NMED recognizes a chromium concentration of 43 ug/L to be representative of natural background,
[D] NMED recognizes a zinc concentration of 260 ug/L to be representative of natural background,
[E] ug/L = micrograms per liter or parts per billion.
[F] NTU = nephelometric turbidity units – a measure of the amount of suspended material in water samples.
[G] mg/L = milligrams per liter or parts per million.
[H] T = listed value is from a measurement on an unfiltered water sample.
[I] D = listed value represents dissolved constituents as water was filtered with a 0.45-micron filter membrane.
[J] NA = water sample was not analyzed for the listed constituent.
[K] N.D. = listed constituent was not detected in water sample, < value = limit of detection.
[L] (j) = listed value is an estimate,
[M] NR = measured value was not reported in the data on file at the NMED.

Figure 1. Monitoring Wells at the Mixed Waste Landfill.