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 Environmental Science and Waste Technology (E)
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U.S. Department of Energy
 Los Alamos Area Office, MS A316
 Environmental Restoration Program
 Los Alamos, New Mexico 87544
 505-667-7203/FAX 505-665-4504

Date: July 21, 2000
 Refer to: ER2000-0351



Mr. John Kieling
 NMED-HWB
 2044 Galisteo Street
 P.O. Box 26110
 Santa Fe, NM 87502

SUBJECT: STATUS OF ACTIVITIES AT MATERIAL DISPOSAL AREA R

Dear Mr. Kieling:

The purpose of this letter is to provide the Hazardous Waste Bureau (HWB) information regarding post-fire activities conducted at Material Disposal Area (MDA) R as discussed during the June 21, 2000 meeting between personnel from the HWB and Laboratory staff. Fire suppression activities were also discussed with Eliza Frank of HWB during a meeting on June 5, 2000. MDA R is designated as solid waste management unit (SWMU) number 16-019 in Module VIII of the Laboratory's Hazardous Waste Facility Permit. The Laboratory's Emergency Management and Response Division, in coordination with the Environmental Restoration (ER) Project, Engineering Sciences and Applications Division, and the Fire Department were involved in fire suppression activities at MDA R through June 13, 2000. MDA R was smoldering after being burned over by the Cerro Grande Fire.

MDA R is a material disposal area that consists of the original WW II S-Site burning ground and associated waste disposal site. It is located north of Technical Area 16, Building 260 and south of Cañon de Valle. MDA R was constructed in the mid-1940s and was used as a burning ground for waste explosives up until the early 1950s. Analytical data and excavation activities show high levels of barium, moderated levels of high explosives and lead, low levels of other metals, and asbestos present at MDA R.

Specific fire suppression activities performed at MDA R are provided in Enclosure 1, while stabilization efforts are provided in Enclosure 2. The Laboratory excavated approximately 800 yds³ of clean soil and 1,500 yds³ of contaminated soil and debris from MDA R during fire suppression activities. The contaminated soil and debris are currently staged within an area of contamination (the SWMU boundary) in accordance with an ER internal standard operating procedure (SOP) entitled Management of Environmental Restoration Project Wastes (LANL-ER-SOP 01.06, Revision 1) and guidance outlined in Management of Remediation Waste Under RCRA, EPA530-F-98-026, dated October 1998.

Waste characterization samples for the contaminated soil and debris were submitted to an analytical laboratory in late June with data expected in the next two weeks. Disposal

HLSWA LANL 3/1082/16



6247

TC

July 21, 2000

options are being evaluated with the goal of shipping the contaminated soil and debris off-site to an appropriate disposal facility during the last two weeks of August. As previously discussed, the ER Project looks forward to examining with HWB an accelerated remedial action process for MDA R in the near future. If you have any questions, please contact Dave McInroy at (505) 667-0819 or Joe Mose at (505) 667-5808.

Sincerely,



Julie A. Canepa, Program Manager
Los Alamos National Laboratory
Environmental Restoration

JC/TT/HWB/eim

Enclosures: 1) Fire Suppression Activities
2) Site Stabilization Activities

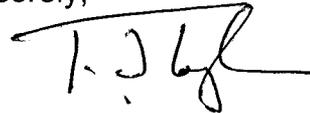
Cy (w/enc.):

M. Buksa, E/ET, MS M992
J. Mose, LAAO, MS A316
D. Neleigh, US EPA (2 copies)
T. Taylor, LAAO, MS A316
J. Davis, NMED-SWQB
J. Kieling, NMED-HWB (3 copies)
J. Parker, NMED-DOE OB
S. Yanicak, NMED-DOE OB, MS J993
E/ER File, MS M992
RPF, MS M707

Cy (w/o enc.):

J. Bearzi, NMED-HWB
J. Canepa, E/ER, MS M992
J. Davis, NMED-SWQB
S. Dinwiddie, NMED-HWB
T. Grieggs, ESH-19, MS M992
D. Hickmott, EES-1, MS D462
T. Longo, DOE-HQ, MS EM-453
D. McInroy, E/ER, MS M992
W. Neff, E/ET, M992
B. Criswel, Roy F. Weston
V. Rhodes, E/ER, MS M992
T. Trujillo, DOE-AL, MS A906
H. Wheeler-Benson, ESH-19, MS M992

Sincerely,



Theodore J. Taylor, Program Manager
Department of Energy
Los Alamos Area Office



Roy F. Weston, Inc.
195 East Road, Suite 104A
Los Alamos, New Mexico 87544
505-662-6445 • Fax 505-662-6635

June 16, 2000

Ms. Mabel Jaramillo
University of California
Los Alamos National Laboratory
P.O. Box 1663, MS M991
Los Alamos, NM 87545

Contract No. TBD
RWF WO No. 02744-070-002

RE: Letter Report – Fire Suppression at MDA-R, Revised

Dear Ms. Jaramillo:

Since Thursday Morning, June 1, 2000, Roy F. Weston Inc., has been involved with the smoldering fire at Materials Disposal Area R. This letter report provides a summary of our ongoing efforts at MDA-R. The efforts are two-phased. First and foremost is the fire suppression. At least 10 areas of visible smoke were evident when we started. All fires are out at this writing. The second part is the stabilization of the spoils piles and the slopes after the fire is out. This will attenuate further environmental damage from erosion of the exposed landfill materials.

On Wednesday afternoon, May 31, 2000, we were contacted by our client to attend a briefing at TA-16 concerning the ongoing landfill fire at MDA-R. From that meeting, chaired by the Assistant Group Leader from ESA-WMM, we learned that previous attempts to suppress the fire had failed. These had included a surface saturation with low pressure water and two foam blankets. High pressure was deemed inappropriate due to the possibility of washing contaminants downslope. We conducted a site visit and inspection to determine whether Weston could provide immediate services to suppress the smoldering fire. The landfill is located on a steep, north-facing slope, and was thought to contain unknown debris, contaminated with heavy metals, and explosive materials, including TNT. A robotics excavator was deemed necessary to prevent personnel exposures to a potential detonation. Weston and subcontractor Boissiere Engineering and Applied Robotics Inc., had the equipment and personnel with excavation and material handling experience from the ongoing remediation of MDA-P.

Thursday morning, personnel from ESA and EM&R met at the landfill and discussed the potential actions necessary. The EM&R personnel considered the actions to still be under the emergency status. We were instructed us to proceed with preparations, and he would be working on the contract requirements. The preparations included removal of some trees, the installation of the robotics control system to Bay 1, Building 260, and the transportation of the heavy equipment to MDA-R from MDA-P. These activities continued Friday morning.



On Friday morning, an additional meeting was held that determined that the Laboratory did not know the status of work to be performed at the landfill, i.e., was it still an emergency. We were instructed to continue with field preparations so that we could proceed with excavation on Monday, June 5. We were also instructed to compile our corporate health and safety plan to cover the field activities. We would receive additional instructions that afternoon. We continued the field preparations all that day. An ESA Safety Officer informed us that we should order fire hose from a local vender, because he could not assure us that LANL could provide enough. At 2:30 p.m., a field meeting was held with the ESA Division Leader, the LANL Director of Operations, and the Weston Project Manager. We were instructed to proceed with all urgency, and to not wait until Monday to proceed with the excavation. All preparations up to that moment paid off, because we could not have started actual excavation when we did had we not prepared.

Saturday and Sunday morning we completed the installation of the robotics system in Building 260 and performed the systems tests. Saturday, a bench was excavated along the top slope of the landfill. This was required to place the robotics excavator within reach of the landfill materials. The spoils from the access bench were placed in a large pile on the mesa top, south of the landfill within the proposed AOC. After they were staged, we performed a field screening for heavy metals with a field XRF instrument. This indicated that the barium concentration of the bench materials was less than 1,000 ppm, near background for the area. At this time JCNNM constructed a temporary, earthen dam in the valley below MDA-R to retain any runoff water.

On Sunday afternoon, we completed the health and safety plan conducted an impromptu readiness review (attached) and started excavation of the landfill. The initial efforts were directed at an open flame fire on the westside. That afternoon and all day Monday, starting on the west part and moving eastward, we removed smoking materials from the landfill. A large tree was pushed over by the excavator to expose burning roots, and very hot materials underneath. Combustible materials included mostly buried trees and timber, with some wire insulation. Charcoal fires from a few feet depth were common and intensely hot. Excavated materials were placed on the bench and doused with water from the fire hose. After wetting, they were moved to the mesa top and staged in piles south of the landfill. By Monday afternoon we had moved approximately one-third of the way across the landfill. We had left landfill materials in place to the west, but these did not contain any obvious smoking materials.

Tuesday and each morning we conducted a visual inspection of the landfill. It appeared that we would need to remove additional materials for access on the east end, as it now appeared that the smoldering fire extended further east than anyone had originally observed. We decided that the area was not in eminent danger and we would continue the robotics excavation systematically eastward. The robotics system then failed its initialization checks. An inspection and diagnosis revealed a failed power supply deep within the onboard computer system on the excavator. A new one was available from Albuquerque the next morning. We utilized the time to excavate the access bench to the lower eastside.

Wednesday morning the robotics system was repaired by the replacement of the power supply. We continued the excavation eastward. The landfill through the middle section was exceptionally thin with only scattered surface debris. Scattered charcoal fires were mixed with the debris. Near the east end, the landfill thickness increased slightly and extended further down the slope. These landfill materials contained the largest smoke emanation in the area, but access to this area required additional access excavation. The excavation was additionally extended beyond the apparent east end of the landfill, because of obvious smoke from what turned out to be tree and shrub roots. Work on the east end continued through Thursday, June 8.

On Friday morning we again, conducted an inspection of the entire landfill. No obvious smoke was being emitted, but we could smell something on the west end. We knew that we had left materials in place earlier that week. A surface survey with an infrared thermometer did not reveal any obvious areas of elevated temperature. We moved the excavator back to the west side and proceeded to excavate the access bench to a lower level to gain access to the materials still in place. Friday afternoon the excavator pushed another large tree over to reveal very hot landfill and timber materials that were still on fire. The heat had been retained under the tree and in the loose landfill materials. Rocks were hot enough to break when doused with water from the fire hose. Charcoal and soils were again placed on the bench and doused with water. It took all afternoon to remove and control the fire in a small area.

Saturday we continued working on the west end. The access was difficult because bedrock outcrops prevents conventional benching and sloping techniques. Another excavator was moved from the MDA-P project to the area to assist in moving materials on the mesa top. We removed as much landfill materials as we could reach from the upper bench. Much of these materials still contained burning debris that only smoked when exposed to the air. The hottest materials were still too low on the slope to reach from the upper bench, however. We doused the area with a water fog from the fire hose and left the area.

The Monday morning inspection revealed that the lower area on the west end was still very hot. The access excavation proceeded down from a point further east to control the grade. Three certified asbestos workers were deployed to stabilize and containerize exposed asbestos containing materials before they were mixed or dispersed by the excavation activities. We did not want to expose our fire suppression crew to these materials. The asbestos materials were bagged and placed in a 55-gallon for disposal.

The excavation of the access road and landfill materials that followed was difficult at best. This required the judgement and skill of a very experienced excavator operator. Based on visual inspection of the landfill materials and the difficult terrain, we decided to proceed with the excavation manually. The bench access was steep and rocky. Once placed on the lower slope of the landfill, the excavator was operated manually with a continuous water stream to cool the exposed materials and control the ash and dust. One tree was pushed over that retained fire beneath it, another did not. The landfill materials were cast from the lower slopes to staging bench where they were picked up by the second excavator and placed on the mesa top.

Approximately one-third of the lower portion of the west end of the landfill was removed on Monday, including about 20 feet of slope area beyond the apparent edge of the landfill. The latter was to ensure that there were no hidden hot spots as there had been on the east end.

On Tuesday, excavation on the lower portion of the west end of the landfill continued. Landfill materials, including incandescent charcoal were removed from the lower slopes and placed on the mesa top and doused with water. Two trees were pushed over and the materials beneath them doused with water and removed. A continuous stream of water was used to control the fire, ash and dust. The excavation remained difficult. The excavator operator backed the equipment up the slope and removed all materials within his reach as he proceeded. A small amount of landfill materials were unavoidably left in place with this procedure. By mid-afternoon Tuesday, we believed that all of the fire at MDA-R had been extinguished.

Wednesday morning, we conducted a walkover of the area for the ESA and ER management, and representatives from DOE LAAO and DOE AL. We agreed at that point that the fire suppression portion was complete and we should proceed with the stabilization efforts. The entire surface area of the MDA-R landfill was inspected by 2 qualified, wildland firefighters on our staff. All areas were observed to be cold with the exception of the western end. On the western end, rocks in the subsurface were observed on Thursday, June 15, to retain a large amount of residual heat from the fire, but are not hot enough to cause ignition. Additionally, little or no fuels remain in the area. These rocks will cool over the weeks to follow.

At this writing, we are demobilizing some equipment and consolidating the spoils piles from the landfill. The robotics excavator has been moved back to MDA-P to complete the work remaining there. By Friday, June 16, we will have evacuated from Building 260. We will continue field work in the area, as we proceed with stabilization efforts. On Tuesday afternoon, we met with personnel from ESH-18 to discuss erosion control measures and the resources required. We are currently coordinating with him to have JCNNM cut and place several dead and standing trees on the slopes, and will obtain and place straw bales for silt control. These efforts will be complete next week.

A volume of approximately 1200-1400 cubic yards is estimated to have been removed from the MDA-R landfill during the past week's efforts. These are staged on the mesa top within the proposed AOC boundary and will be stabilized with a berm and a soil surfactant to inhibit erosion and resuspension. Field screening of these soils with a field XRF instrument indicates contamination with barium (5,000-18,000 ppm) and possibly lead. No high explosive chunks or radioactive materials were found during the excavation. No volatile organic contamination was observed by field screening with a direct reading field instrument (PID). Two small, 50 mL glass bottles were removed from the soils that contained unknown liquids. These were moved to a satellite storage area. A 55-gallon drum with bagged asbestos materials was also staged for disposal. All large debris (concrete and steel) is staged separately. All of the debris from the landfill appears to have been burned or flashed. Little combustible waste materials were found in the landfill. The fire appears to have been confined to buried trees and timber and some wire insulation.

Approximately 800 cubic yards of overburden materials were excavated for landfill access. This has been staged separately from the landfill materials and will be used in the days to come for slope stabilization and berms around the landfill spoils pile. Field screening of these materials indicate that barium is below 1,000 ppm.

Recommendations

The following recommendations are made on the basis of the actual conditions observed at MDA-R during the excavation efforts described above.

- The waste piles should be sampled and disposed of properly. Stabilization efforts at this time will be temporary. Additional maintenance efforts will be required if the spoils piles remain more than a few months. It is likely that laboratory analysis will indicate that the soils are hazardous wastes. The timely disposal will be in keeping with best management practices for this type of material.
- The excavation of additional materials from the slopes of MDA-R should be guided by sampling. Some landfill materials remain, but it is estimated that over 90 percent were removed during the fire suppression efforts. Further excavation during the current efforts was not warranted. A small amount of additional landfill material could have been removed, but would have required removal of a large amount of overburden. Future excavation without sampling may result in excess materials being removed and hence, excess costs.
- There is currently no evidence that additional excavation efforts at MDA-R should be performed by a robotic excavator. Inspection of the excavation spoils indicates that no large, intact pieces of high explosives are present that would warrant such efforts. There may very well be high explosives distributed throughout the soils. The portion of the landfill that remains to be excavated appears relatively small and may be difficult to access. Placing a robotics excavator in this difficult situation may be more unsafe than a conventional excavator equipped with blast protection for the operator. An operator sitting in the cab will have a greater feel for the stability of the equipment.

If you have questions, please contact me or Rita Muniz at (505) 884-5050.

Sincerely,



C. William Criswell
Sr. Project Manager

CWC/

pc: K. Bostick EES-15 MS- M992
D. Hickmott EES-1, MS-M992
R. Grace, ESA-FM
A. Sherrard, ESA-FM
R.V. Ortiz, ESA-WMM
P. Boissiere, BEAR Inc.
Rita Muniz RFW ABQ

Readiness Review Check - MDA-R Fire Extinguish 6/4/00

Excavation Permit - pending - 6/5/00 granted 0855
Roy F. Weston - No. OOX-0317

- ✓ Health and safety Plan - RFW
- ✓ Slope Access completed
- ✓ Fire Department notification - radio by Bill McC.
- ✓ Personnel Training / Site Briefing
- ✓ ESA notification
- ✓ Robotics System Checks - manipulator arm still has error messages - excavator OK
- ✓ Brush cleared / consumables + flammables removed
- ✓ Exclusion Area ID'd w/ barrier tape - gates
- ✓ Staging Area complete
- ✓ Water Truck stayed / full

Attendee: Bill McCormick - ESA
 Diane Spengler RFW
 Peter Boissier BEAR Inc.
 Fred Gray RFW

14:40
 6/3/00
 date

Operational Check conducted by: CW Curran
 Location TA-16 Bldg. 210

[Handwritten initials]



Roy F. Weston, Inc.
195 East Road, Suite 104A
Los Alamos, New Mexico 87544
505-662-6445 • Fax 505-662-6635

July 6, 2000

Ms. Mabel Jaramillo
University of California
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P.O. Box 1663, MS M991
Los Alamos, NM 87545

Contract No. TBD
RFW WO No. 02744-070-002

RE: Letter Report – Fire Suppression at MDA-R - Update

Dear Ms. Jaramillo:

Since Wednesday June 14, 2000, Roy F. Weston Inc., has been involved with the stabilization efforts at Materials Disposal Area R. This letter report provides an updated summary of our ongoing efforts at MDA-R after suppression of the smoldering fire. The recent efforts concentrated on the stabilization of the spoils piles and the canyon slopes, a survey of the remaining concentration and location of heavy metal contamination, and the recourse of a small arroyo that did drain through the landfill. The stabilization efforts have taken a little longer than originally estimated because of the lack of support from JCNNM. That group appears to be overwhelmed by the magnitude of the cleanup after the Cerro Grande fire.

On Thursday June 15, we anticipated that tree cutters would fell the burned snags in the area. We wanted to fell them parallel to the slopes to assist with slope stabilization. The cutters did not arrive until Friday morning. They worked for about an hour, left for lunch and have never returned. We could not place the straw waddles until the trees were felled. Monday we did not work in the area at all. Tuesday we were informed that the cutters would not return and that we would have to arrange for transportation of the straw materials ourselves. We arranged for a truck the following morning and used the day to construct an earthen berm around the spoils pile.

Wednesday through Friday we continued to cut and place the dead and burned trees along the mid-slope below the landfill. We packed and staggered straw waddles along the trees to act as silt control. This construction serves to attenuate silt migration while allowing water to pass. We also replaced the soil removed from the access bench that had been staged on the mesa top. This material was not placed on top of any landfill materials that we are aware of. Straw waddles were also placed along the upper portion of the slope at the break in slope to attenuate silt migration. The top of the bench was left as a generally rough surface to allow infiltration and slow water run-off. This will also allow the area to be reseeded if it is decided to do so.



During this time, we also conducted a contamination survey of the slope exposed by the excavations. We did not perform this screening during the fire suppression activities because the driver was simply fire suppression. The soils must also be dry for an accurate measurement. We performed this survey at this time as an act of environmental stewardship. We used a field X-ray fluorescence instrument that measures heavy metals. Barium and lead are believed to be the principal contaminants at MDA-R, as they have been at MDA-P. This instrument has served well at MDA-P to act as a field screening tool for these metals. We also analyzed samples of the excavated materials after they dried during staging.

The XRF survey of the residual landfill materials and slopes indicates that soils contaminated with barium remain in the central area. Surface concentrations of barium locally exceed 200,000 parts per million (ppm) near the former drainage arroyo, decreasing to a few tens of thousands ppm east and west from the arroyo. The apparent extent of contamination is skewed eastward downslope. A few shallow, subsurface samples, ≤ 1 foot depth, indicate that contamination $>14,000$ ppm is present at shallow depth. A crude map of the results is attached. All of the upper slopes were disturbed or excavated during the fire suppression efforts. These efforts may have exposed contaminated soils at the surface where they did not exist before the fire. The contamination also appears to extend downslope into the existing standing, unburned trees. These areas were not disturbed during the fire suppression efforts.

On Friday, during the field screening survey, we discovered numerous intact pieces of barium nitrate. All of these were located within the area of highest barium contamination near the former drainage. These pieces varied in size from an inch or two in diameter to over foot across. Many were masked by a thin coating of soil. Some were partially dissolved and crumbled when handled. These pieces had been overlooked during the fire suppression efforts because they blended in with the many pieces of white plaster in the landfill. We removed these pieces to eliminate further contaminant migration. Approximately 100 pounds of suspect barium nitrate was placed in a lined 55-gallon drum and removed from the area for management.

On Monday June 26, we completed the straw waddle installation on the slopes and around the spoils pile. We also sprayed the spoils pile and the slope area with the elevated barium concentrations with a surfactant to inhibit erosion and resuspension. This surfactant will have to be reapplied every other month or so to maintain its efficacy.

On Tuesday morning, we conducted a walkover inspection of the area. This walkover by Weston management included an inspection of the remaining landfill materials, silt controls, removal of orphan debris, and review of the contamination map. Inspection of the drainage arroyo south of the landfill indicated that a significant rainfall could breach the temporary dam installed and drain through the most contaminated portion of the landfill.

A heavy rainfall did indeed occur midday on Wednesday, June 28, but did not breach the temporary dam. That evening, we placed approximately 50 cubic yards of soil fill at the temporary dam to prevent it from breaching. The following morning we were instructed by ESA and ESH-18 personnel to excavate temporary a drainage ditch from the dam to the canyon edge,

west of the landfill. Our contamination survey indicated that water from this new ditch would not drain through a contaminated area.

The new diversion ditch was completed on Friday June 30. It consists of a simple, unlined ditch approximately 100 yards long, with a local rock re-enforcement. Straw waddles were placed along the ditch to attenuate silt, yet allow water to pass. The spoils from the excavation were placed on the downhill side along the length of the ditch. This ditch now completely replaces the former arroyo that drained through the landfill. The ditch now drains west of the landfill through a relatively clean area that does not exhibit any exposed landfill debris. This will inhibit further contaminant erosion and migration. The landfill will now be affected only by direct precipitation.

On Monday July 3, a small smoke emission was observed on the lower west side of the landfill. This was inspected and found to be small pieces of charcoal. This was not surprising, as it was in an area, identified in the last letter report, that we knew to contain residual heat and small pieces of roots and wood, but no real fuel materials. We have and will continue to monitor this area.

At this writing, we have demobilized all of our personnel and equipment from MDA-R. We will inspect the area after the next rainfall event to ensure that the erosion control devices are working properly. The spoils pile is stable and is currently located within the proposed AOC boundary. The pile has an earthen berm with straw waddles to prevent run-off. The surface was resprayed after the heavy rainfall on June 28, with a surfactant to inhibit run-off and resuspension. The soils removed for the access bench were replaced and are now part and parcel of the landfill slopes. The slopes are protected from run-off by straw waddles, and have been locally sprayed with a surfactant to inhibit run-off and resuspension. Landfill materials are known to remain in place in the central and western portions. The central area appears to be a veneer of residual materials, while the far western part may contain thicker portions of buried landfill. The entire area is identified with caution tape and rope to prevent unauthorized entry.

Recommendations

The following recommendations are made on the basis of the actual conditions observed at MDA-R during the field efforts described above.

- The fire hydrant on the north side of Building 260 should be repaired. During the fire suppression activities the stem seal leaked severely during use causing run-off into the drainage arroyo. This excess water also undermines the stabilization of the fixture.

- The slopes of MDA-R that exhibit elevated concentrations of barium should be removed. A significant volume of contaminated landfill materials remain in place. The fire suppression and stabilization efforts were not directed at removal of the entire landfill, only those portions that were obviously on fire or suspected to cover a buried fire. The contaminated area appears to be largely confined to the central area around the former drainage arroyo. Some contaminated materials were exposed to the surface during the fire suppression. Although run-on water is now diverted westward, it will be difficult to maintain slope stability and therefore it will be difficult to prevent further contaminant migration. It appears that the majority of heavy metal contamination is associated with the central part of the landfill where the barium pieces were found. Buried contamination may also reside in the far western areas.

If you have questions, please contact me or Rita Muniz at (505) 884-5050.

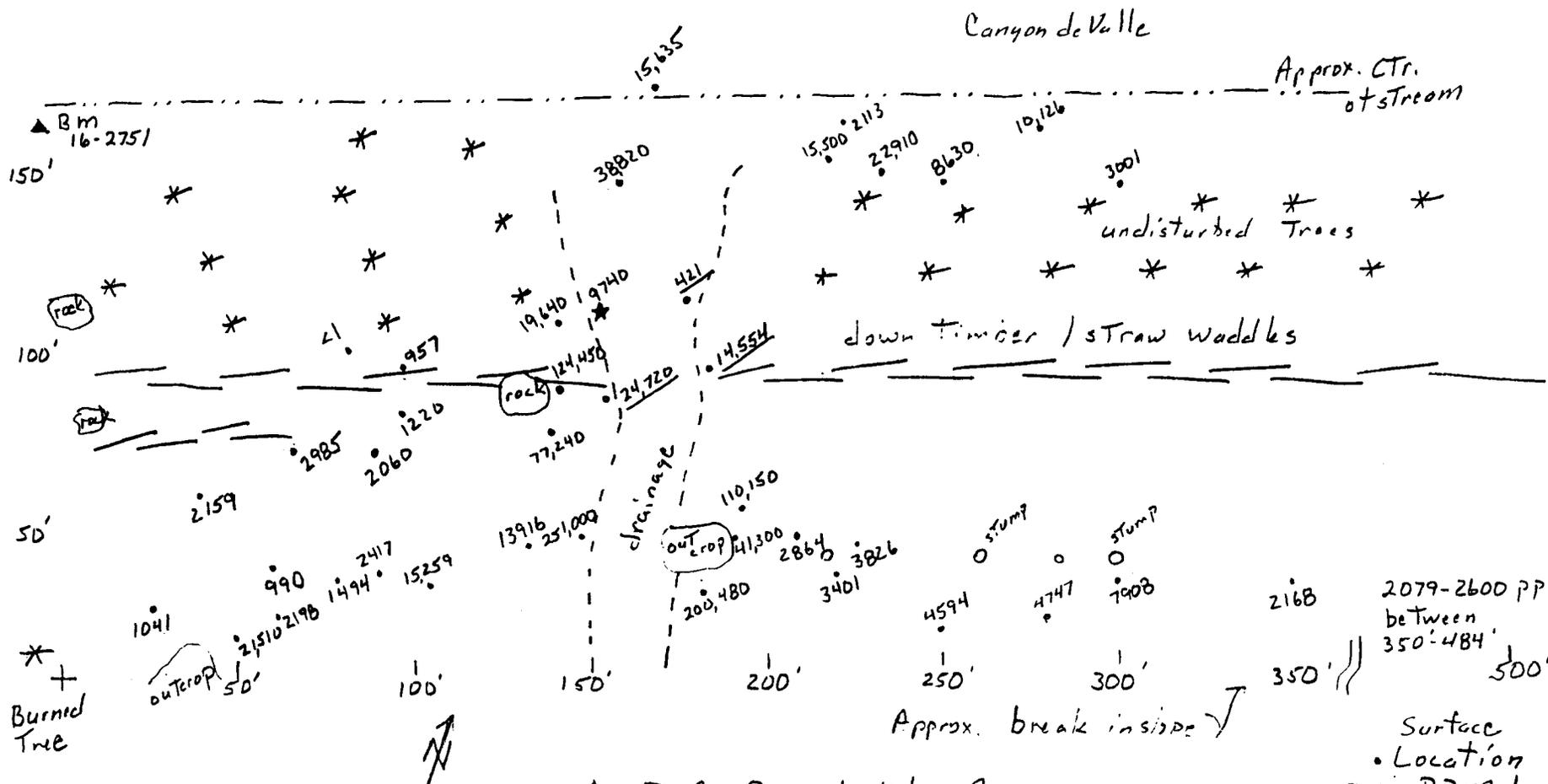
Sincerely,



C. William Criswell
Sr. Project Manager

CWC/
Attachment

pc: K. Bostick EES-15 MS- M992
D. Hickmott EES-1, MS-M992
S. Veenis, ESH-18, MS-M992
R. Grace, ESA-FM
A. Sherrard, ESA-FM
R.V. Ortiz, ESA-WMM
Rita Muniz RFW ABQ



MDA-R sketch Map
- Barium concentrations

6/28/00

Approx. break inside

2168

2079-2600 ppm between 350'-484'

500'

Surface Location

996 PPM barium by field XRF

996 subsurface value

* LANL sample Location