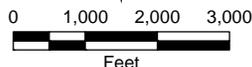


Rocky Mountain Arsenal Off-Post DIMP Distribution
2004, 2007, & 2009

Figure 6.3.1-2

Legend

- Rocky Mountain Arsenal as of August 2006
- RMA National Wildlife Refuge
- Slurry Walls
- Recharge Trenches
- Extraction Wells
- Recharge Wells
- Area of DIMP concentrations exceeding 8 ug/L (Dashed outlines where approximate)
- 2009
- 2007
- 2004



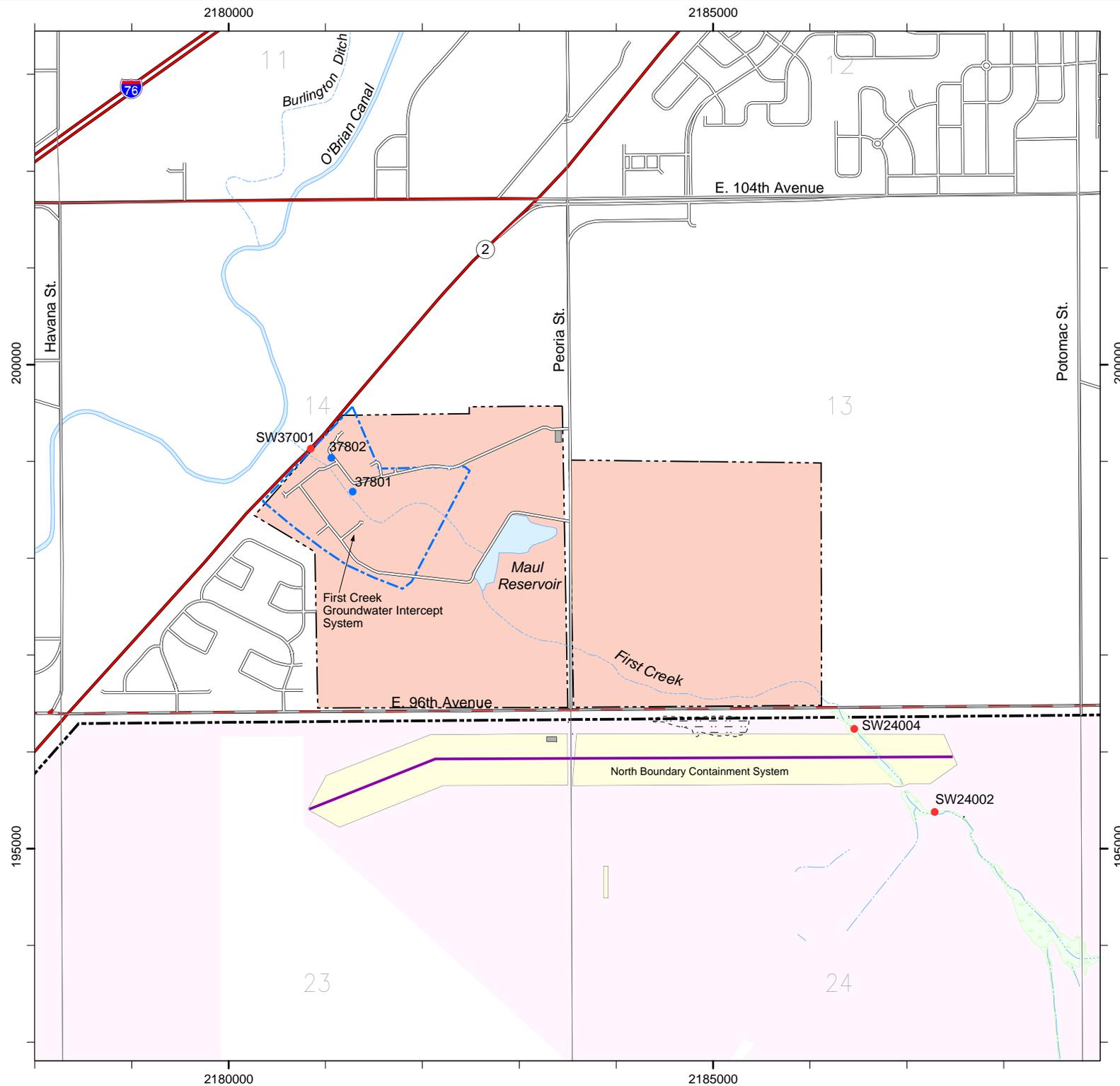
Colorado Stateplane Coordinate System,
North Zone, U.S. Survey Feet, NAD 1927



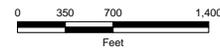
Sources: U.S. Army BIMS, Washington Group,
USGS, RVO GIS

Remediation Venture Office GIS

**Figure 6.3.2-1
Rocky Mountain Arsenal
Off-post Surface Water
Monitoring Locations**



- Rocky Mountain Arsenal
- U.S. Army Property
- USFWS National Wildlife Refuge
- Lakes, Ponds, and Rivers
- Wetlands
- Dry Lake Areas
- Buildings
- First Creek Groundwater Intercept System
- Shell Property
- Section Lines
- Intermittent Streams
- Ditches
- Off-Post Primary Road
- Off-Post Secondary Road
- Off-Post Light Duty Road
- Slurry Walls
- Surface Water Sites
- Selected Groundwater Wells



NAD27-NGVD29 Datum, US Survey Feet, Colorado North Zone

Sources: U.S. Army BIMS, USGS, RVOGIS, URS - Washington Division

Remediation Venture Office GIS	
GIS Analyst: R. Smith	Figure 6.3.2-1
Date: 9/23/2011	
Scale:	
Prepared For: B. Charles	
Approved:	
File Location: M:\projects\site\review_05_09\mxd\5yrr_6.3.2-1_offpost_sw_11x8.mxd	

Appendix A

2010 Five-Year Review—Community Interviews

2010 Five Year Review—Community Interviews

What do you know about the Rocky Mountain Arsenal and the cleanup that has occurred?

Many of the respondents have been aware of and involved with the Arsenal for several years, some more than 30 years. A majority have been aware of the site and its cleanup for 10 years or less. The majority became aware of the site from living in close proximity to the site or from working with government and environmental officials during the beginning stages of the cleanup.

Were you in the area during the cleanup?

All of the respondents were in the area during some phase of the environmental cleanup program.

Do you have any personal concerns about the cleanup?

None of the respondents had any concerns about the cleanup. However, a few had general comments about the site.

One respondent is very comfortable with the cleanup and expressed a level of trust with the RVO and regulatory agencies about the cleanup design and implementation. However, this respondent periodically wonders if there is any airborne contamination that visitors may pick up from spending a lot of time at the site.

Another respondent did voice concern over the sign at the South Gate that reads “The guard will conduct ID checks on all visitors.” This respondent worked very closely with the Latino members of the surrounding communities and felt that this particular sign discourages them from entering the site to participate in the programs.

One respondent felt that the cleanup program is really a mitigation because contamination was left on site. This respondent understands the financial limitations to the environmental program and supports the Record of Decision, but never agreed with leaving waste on-site. This respondent would have preferred to have the contamination neutralized or destroyed. This respondent also did not agree with the fences around the landfills and would have liked to see other options that are not so intrusive.

Are you aware of any community concerns about the cleanup?

A majority of the respondents haven't heard any concerns about the cleanup from the community. Some respondents cited concerns from many years ago that they were contacted about but nothing presently. Most of the comments they hear from the community deal with what the U.S. Fish and Wildlife Service is doing and are primarily positive.

One respondent voiced a concern they hear – they aren't allowed to come freely to the Refuge like an open space.

Another respondent had a constituent raise a concern during a campaign about the groundwater right as Shell was finalizing the transfer of their property to Commerce City. The constituent just wanted to make the issue known but didn't have any real problems.

How do you think the overall remedy is functioning?

A majority of the respondents were pleased with the overall remedy and that it is meeting its objectives.

Do you have any additional comments, questions or suggestions regarding the cleanup?

All of the respondents didn't have any other comments, questions or suggestions regarding the cleanup.

One respondent said from their perspective the cleanup is going as anticipated during early negotiations.

Another respondent noted that the site is now a Refuge and its mission should be the priority instead of the site's history. This respondent suggested letting the visitors' own curiosity/interest lead into questions about the cleanup and history, versus beginning all discussions with historical information.

Appendix B

Public Comments Received and Responses to Comments

SITE SPECIFIC ADVISORY BOARD OF THE ROCKY MOUNTAIN ARSENAL, INC.

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Elizabeth Montgomery * Daniel P. Mulqueen * John Yelenick *

April 8, 2011

Citizen Report Re: Rocky Mountain Arsenal “Clean-up”
2005 – 2010 Five-Year Review

A formal written review is required by law every five years to assess the overall remedy effectiveness, underlying assumptions, and protectiveness to human health and the environment of a “clean-up” at all contaminated sites that have been “cleaned-up” pursuant to CERCLA (the Comprehensive Environmental Response, Compensation, and Liability Act). We put “clean-up” in quotation marks to denote that at Rocky Mountain Arsenal there is no clean-up – the thousands of tons of Army and Shell Oil Company-generated contamination will remain in the ground or be placed in a hazardous waste landfill.

The following is *A Citizen’s Report* regarding the activities at the Rocky Mountain Arsenal (RMA) during the years of 2005-2010. The 2005-2010 Five Year Review, prepared by the U. S. Army and Shell Oil Company (hereinafter referred to as the Polluters) is comprised of several volumes but references hundreds of documents to support the contentions that the remedy as designed is protective of human health and the environment, that the “clean-up” projects have been performed properly and are effective, that the underlying assumptions about protectiveness are still valid, and that the protection of the public and the safety of the workers have been top priorities.

The following *Citizen Report* reviews the primary issues of 2005-2010 from a citizen’s perspective, focusing on the primary and long-term issues of protectiveness of the public, both directly and indirectly. The *Citizen Report* has been prepared by the Site Specific Advisory Board (SSAB) of the Rocky Mountain Arsenal (RMA), Inc.

1. Background: Site Specific Advisory Board of the Rocky Mountain Arsenal, Inc.

In 1994, citizens concerned with the “clean-up” of the Rocky Mountain Arsenal presented a 300-signature-petition to Colorado Governor Roy Romer, requesting that a citizen advisory group be established based on *the Report of the Federal Facilities Environmental Restoration Dialogue Committee* (FFERDC). In response to that petition, the ***Site Specific Advisory Board of the Rocky Mountain Arsenal*** was formed in early 1994 by the State of Colorado and EPA Region VIII, as the first Site Specific Advisory Board (SSAB) established at a Department of Defense (DOD) “clean-up” site.

The ***Site Specific Advisory Board of the Rocky Mountain Arsenal*** has met regularly since its inception. Its meetings are open to the public and its programs often include presentations from, and discussions with, the Army, Shell Oil Company, EPA, the State of Colorado, the US Fish and Wildlife Service, and Tri-County Health. The ***Site Specific Advisory Board of the Rocky Mountain Arsenal*** incorporated in December 2000 as a not-for-profit corporation. Regular attendees also serve, or have served, on other RMA-related or RMA-interested boards including, but not limited to, the Restoration Advisory Board (RAB), the Citizen Advisory Board (CAB), the Medical Monitoring Advisory Group (MMAG), the Sierra Club RMA subcommittee, the National Caucus of RAB Community members, Montbello community groups, the Northern Coalition, and the City Council of Commerce City.

The Rocky Mountain Arsenal is one of the largest and most expensive “clean-up” projects to date in the United States. At the completion of “clean-up”, it will become the Rocky Mountain Arsenal National Wildlife Refuge, intended to attract national and international visitors. As such, the RMA affects citizens and communities bordering RMA, as well as those of the Denver-metropolitan area, the State of Colorado, the United States and potentially the entire planet. It is for this reason the ***Site Specific Advisory Board of the RMA*** seeks and encourages the involvement of all citizens and interested persons. The Site Specific Advisory Board of the Rocky Mountain Arsenal, Inc. received a Technical Advisory Grant from the U. S. Environmental Protection Agency in 2001.

2. Background: Delay of Five Year Reviews and Breach of Public Trust

The Five Year Review, required by federal law under CERCLA, is prepared by the polluters [in this case the Army and Shell Oil Company] and is filed with the Environmental Protection Agency (EPA). The Rocky Mountain Arsenal 2000 – 2005 Five-Year Review was supposed to be finalized in 2005 but was not released for public review until 2007. The *Draft Final Five-Year Report for the Rocky Mountain Arsenal* was originally filed with the EPA in July 2005 (right on schedule) and the report was of such poor quality that the EPA issued seventy-five pages of

substantive comments with the explanation that the large number of comments was “ due to factual inaccuracies presented within the Report as well as non-adherence to the basic requirements of the EPA Guidance [Comprehensive Five Year Review Guidance]. The EPA further stated that, “the Report focused on broad generalizations without supporting documentation or conduct of the technical assessment required by the Guidance.” (USEPA letter dated September 26, 2005).

The primary focus of the EPA’s initial comments in September 2005 was the groundwater monitoring program at RMA. In response to the approximately seventy-five pages of questions and comments from EPA, the parties agreed to revise the Long Term Monitoring Plan (LTMP), which was completed in March 2010. Without notice or explanation, the polluters did not solicit or allow public comment on the LTMP, one of the most important documents at RMA since it established the groundwater monitoring protocols and goals at RMA for the next many decades. Therefore, the SSAB has focused of the LTMP in these Five-Year Review public comments.

The 2005-2010 Five-Year Review was filed in February 2011, still late. Although it is of better quality than the Five-Year Review submitted in July 2005, the extensive report appears to be substantially the same report filed in 2007, with updated numbers, but still sets forth assumptions and draws conclusions that are not evidenced or substantiated. This is especially true in regard to long-term groundwater monitoring. We frankly expected the parties to perform a vigorous review and analysis of the long-held assumptions of contaminant pathways and the quality of water monitoring data, as part of the revised LTMP. Apparently, this did not happen. We will address these issues in greater depth in Paragraph 6, below.

The Five Year Review process was designed to provide regular and continuing review of a remedy, both in terms of current project operations and, most importantly, in review of the ongoing effectiveness of the operations and maintenance of remedy projects that have been finished, in order to insure protection of public health and the environment. Such a review is of highest importance at a site like the RMA where thousands of tons of highly contaminated soils are being left in place in the ground and the contaminated groundwater will need to be treated for hundreds of years into the future. The Polluters made a promise to the public – that they would provide timely and high quality review of the effectiveness of their ‘containment’ remedy – when they fought for (and sued for) a remedy that would leave thousand of tons of contaminated waste at the RMA rather than to actually clean up, or remove, the contamination.

As we stated in 2007, the poor quality of the Polluters’ initial 2000-2005 Five-Year Review, combined with the mundane duplication contained in the 2005-2010 Five-Year Review, is continued evidence that the Polluters do not really care about the protection of the public – contrary to their propaganda. In addition, the RMA-SSAB public comments regarding the 2000-2005 Five-Year Review provided extensive evidence of the RMA Polluters’ contempt for the public, including lies to the public and a Colorado Grand Jury. We do not see much improvement during the past five years at RMA.

The most unnerving aspect of the poor quality of the Draft Final Report, as provided in July 2005, is that this report was prepared while “clean-up” is still in process, during a time that the EPA and the State of Colorado are still actively involved in the regulation of the remediation at RMA. If the polluters are bold enough to provide such a poor quality report while everyone is engaged and paying attention, and if the Polluters are bold enough to create a new, revised version of the Long-Term Monitoring Program without questioning earlier assumptions and substantiating long-held conclusions, imagine how poor the future reports will be when the budgets for regulatory oversight have been slashed and people who are familiar with the Rocky Mountain Arsenal are no longer watching and holding the Polluters accountable. These are not rhetorical observations and concerns, as the Polluters have already tried to reduce their financial contributions to the EPA and the State of Colorado for regulatory oversight and staffs of both regulators have been significantly reduced over the past three years.

The Five-Year Review should be detailed, “consumer friendly”, and should serve the purpose of presenting understandable information to the public that substantiates that, in fact, the remedy is working properly and the public is as protected as possible. In addition, the Five-Year Review document should provide enough details to serve as a stand-alone document for someone who doesn’t know the history of RMA, including an explanation of how to easily access the supporting documentation. This document covers the activities and data collection of a five-year period of time, and must additionally address the protectiveness of the on-going remedy and the adequacy of its underlying assumptions. Given the length and importance of the RMA Five-Year Review, **the public should be allowed an extensive period of time to provide comment, but in no case less than 90 days.**

3. Collection of Quality Data, Database Management Systems, and Meaningful Availability to the Public

The RMA-SSAB has an on-going concern about the treatment of data and database management systems and the Public’s accessibility to relevant information in those systems at the Rocky Mountain Arsenal. This is especially important now that the primary focus of the remedy is groundwater monitoring to insure that the remedy of choice – the burial of thousands of tons of contaminated soil at RMA – is and remains effective, and protective of human health and the environment.

The Public understands that data gathering efforts and field experiments, as well as scientific and engineering inquiry and analysis are not perfect and thus some data produced by these activities are statistical outliers, errors, field and lab duplicates, etc. Data can be complex, as can rationale for including or excluding various data points from analytical datasets. For these reasons, oftentimes responsible parties do not want to maintain transparent datasets for the public such as the raw water

quality datasets underlying their analyses or collected in support of long-term monitoring efforts. At the Rocky Mountain Arsenal, it is now necessary to provide The Public with a view into the datasets that are used for and generated by analyses in support of the remediation and long-term monitoring activities.

For all datasets and reports there should be a requirement that a clear distinction be made between raw data and interpreted data. Additionally data quality flags must be used and clearly documented to ensure appropriate datasets are being considered for analysis, as well as data integrity. Technology exists to make these data accessible and digestible for regular citizens. One such example is the USGS National Water Information System (NWIS) Web Interface (<http://waterdata.usgs.gov/usa/nwis/qw>). This will go a long way to re-establish public trust and ensure citizens stay informed so as to not slow the process of remediation or otherwise compromise the efforts long-term containment goals established at the Rocky Mountain Arsenal with costly side discussions and raising of issues that are out of date and off topic.

Furthermore data must be stored in a way that most accurately reflects the real world system being observed. For example, if a water sample is taken from a discrete well interval at a particular x and y location the database structure must have tables in which to store and reveal well construction, well location, and water quality time series data. In addition, the database tables must capture the details of the x and y location as well as the well screen elevation with respect to the local hydrostratigraphy. Data models are available in a number of formats for and an industry standard data model should be adhered to and made available to the public for viewing via a read-only web interface, such as the USGS NWIS interface. Monitoring well locations and construction information, hydrostratigraphic unit properties, water level and contaminant time series, and pump test results, etc. are currently stored in a relational database management system and could easily be made available to the public for viewing only in a map-enable web interface. Ideally, as with many modern systems, a citizen would be able to select from a series of drop down menus to filter and query datasets of interests for mapping and graphing.

Data is not useful information unless it is accompanied with sufficient documentation such that any user could understand its meaning and origins. The database should provide a cradle-to-grave and grave-to-cradle traceability of valid and accurate datasets in much the same way chain of custody is handled for field and lab samples. The databases should be routinely audited by a third party to ensure the integrity of the data, data validation processes, results, and audit trails.

Finally, for all analyses and reports there should be a requirement that a clear distinction be made between raw data, interpreted data, assumptions and conclusions. Data must be provided as evidence to support any reported conclusions. Rationale must be provided based on accepted, peer reviewed scientific and engineering reports for every assumption. Tracing these data and assumptions from a report back to its source via a data management system helps to ensure that the science and analyses performed for the Rocky Mountain Arsenal are robust, the containment and

remedial activities are working as designed, and the assumptions made during site characterization and remediation are valid.

4. **Need for Full Assessment of Sub-surface Contamination Resulting from the Operation of Deep Well Injection Activity**

The nature of the waste injected in a deep well at the RMA and the horizons of contamination associated with it are not publically known or understood. Given the greatly increased natural gas drilling activity locally, we are deeply concerned regarding the potential for open pathways for this contamination. A full assessment on this contamination should be performed and the results made immediately available to the public.

5. **On-Going Issues**

a. **Substantive and Meaningful Public Participation**

The RMA parties meet regularly with the public and provide technical personnel and documents, both of which are appreciated. Although public participation is mandated by law, there is no specific definition of public participation, so it can – and does – take many forms. Two primary elements of substantive and meaningful public participation are missing at RMA:

[1] Decisions are made by the five RMA parties before documents are released for public comment, based on an “announce and defend” structure that renders public comment little more than unnecessary opinion – or window dressing; and

[2] There is little or no follow-up on public comment – or engagement with the public after comments has been provided – before the original decision of the five parties (made privately among themselves or “behind closed doors”) is carried out.

One of the most important issues for long-term protection of the public is to insure protectiveness of the remedy through long-term groundwater monitoring. The plan that for Long-Term Groundwater Monitoring is currently being revised, primarily in response to the issues raised by the EPA in response to the Polluters’ *Draft Final Five-Year Report for the Rocky Mountain Arsenal* that was originally filed with the EPA in July 2005. In order to improve public participation at RMA, and in response to the issues and concerns set forth above, the SSAB hereby formally requests that the SSAB’s technical advisor, hired pursuant to an EPA Technical Advisor Grant (TAG) be allowed to participate with the other five RMA parties in the revision of the Long-Term Groundwater Monitoring Plan.

b. ROD Requirement for a Trust Fund

The SSAB believes that this ROD requirement has not been met. This requirement was included in the ROD at the behest of the SSAB. It is unconscionable that a report was prepared to explain why this ROD requirement has not been accomplished and will not be accomplished without first discussing it with the SSAB and without providing it to the SSAB for comment before it was finalized. This is yet another example of the Polluters' contempt for the public – or maybe just for the SSAB.

c. ROD Requirement for Baseline Health Assessment and Medical Monitoring

For more than two years several citizens of the RMA-SSAB were active members of the baseline health subcommittee of the Medical Monitoring Advisory Group (MMAG) program. We participated in the crafting of numerous documents to facilitate protection of human health during remediation efforts at RMA. We would like to stress that the title of this working group is a misnomer. The baseline health subcommittee should not be construed as having generated documents that proposed evaluation of community health or the conductance of baseline measurements. Rather, the committee operated under the assumption that the environmental monitoring system will be stringent enough to protect the health of the public.

Dissatisfaction with the focus and progress of the Baseline Health Subcommittee was identified early by the citizen members, who believed that the RMA parties were attempting to sidestep the commitment to the public (and made a requirement of the RMA On-Post Record of Decision) for a baseline health assessment. Dr. Dorothy Colagiovanni addressed these concerns in a memorandum with specific recommendations for the review and inclusion of several technical issues. (Memorandum from Dr. Dorothy Colagiovanni dated October 1997.)

Baseline health assessments are a common and expected method of ensuring protection of the public and are relied on by the public at contaminated sites all over the United States. Contrary to the edicts of the ROD, baseline health assessments were never conducted on neighboring RMA citizens. Denying the affected and vulnerable population the information promised in the ROD seems a deliberate insult. A number of excuses were given for not conducting the baseline health assessment (Dr. Colagiovanni Memo), but none of them compelling.

The consequence of this decision is that those taxpayers who live surrounding the RMA will never know if their health was impacted by “clean-up” activities. There are social justice issues that relate to RMA from economic and racial perspectives, and it is

tragic that those with the least resources may have long-term health effects from RMA contaminants. It is for these reasons that the SSAB does not consider this ROD requirement completed or the public health to be protected. Because of dissatisfaction with the MMAG process and final products, a minority report was filed with the Polluters and CDPHE (Baseline Health Sub-Committee Minority Report).

d. Land Ban and CAMU

The SSAB continues to contend that the permanent placement of many of the contaminated wastes at RMA violates the Congressional Land Ban by inappropriately siting contaminated waste outside of a certified, designated hazardous waste landfill. Even though some parts of the RMA remedy were exempted from the Congressional Land Ban under the Contaminated Area Management Unit (CAMU), a regulation promulgated by EPA, this CAMU regulation was successfully contested and the placement of much of the contaminated waste, particularly that which was not included in the original On-Post and Off-Post RODs, is subject to current laws and regulations and is illegal.

e. Poor Site Characterization

The SSAB notes again that the site characterization at RMA was minimal, given the size of the site and the extent and complexity of the contamination, and is based on incomplete documentation. The negative consequences of poor site characterization are set forth in many of the topics discussed in this *Citizen's Report*. The consequences of a poor site characterization are exacerbated, however, by the following problems and discrepancies at RMA:

- i. The Polluters believe that the site characterization is adequate, if not good. The inability or unwillingness to continually take into account the possibility of error based on poor or incomplete site characterization puts everyone at risk, especially the community since such errors are likely to manifest over a long period of time.
- ii. The Polluters insisted – and the RMA parties agreed – that there would be no further soil sampling for purposes of further site characterization.
- iii. The Regulators are limited to a set number of confirmatory soil sampling. Such confirmatory soil sampling is used by the Regulators to ensure that the “clean-up” projects have been successful and that all contamination has been identified and removed or contained. This limit is arbitrary and capricious, and is contrary to the protection of the public.

This limit on the number of confirmatory soil samples that the Regulators are allowed to use during the fifteen-year-long “clean-up” at RMA is particularly hard to justify in the face of a poor and incomplete site characterization. There have been dozens of public discussions (and one can

only assume hundreds of private discussions) of the constraints that this “rule” places on the Regulators and the consequences to the quality of their ability to insure that the “clean-up” really is protective of human health and the environment.

- iv. Incomplete documentation at RMA is a fact, evidenced most recently by the fact that no reference to the ten Sarin Nerve Gas bombs was found in the year-long review of RMA documents for the preparation of the new UXO report in 2002. However, the lack of complete documentation at RMA regarding UXO and contamination has been known- and reported – since the 1950s, and therefore there is no excuse for pretending or assuming that the site characterization at RMA is complete, adequate, or can serve as the basis for a truly protective remedy. Consider the following public statements as examples:

2/25/74 – Rocky Mountain News (RMN). Arsenal Waste Disposal Data Nonexistent, by H. Peter Metzger. “Through most of its 30-year history the Rocky Mountain Arsenal (RMA) kept no records on the nature and amount of wastes it disposed of, the Army says in the first comprehensive report on the subject.

“The report was prepared at the request of Rep. Pat Schroeder, D-Colo. Six months in the preparation, it consists of a review of Army records and those of industrial lessees using arsenal facilities – where such records exist.

“The report tells more of how little, rather than how much, the Army and others know about the waste disposal operations at the arsenal, which has been both a manufacturing and storage site for chemical warfare agents.

“. . . Consider the Julius Hyman Company, which leased and operated an insecticide manufacturing plant at the arsenal from 1946 to 1951. In response to an Army inquiry, Dr. Hyman answered, “I have no records pertaining to that subject matter and my memory of it, if I ever knew, is unreliable.

“During the Korean War the situation persisted. ‘No records were maintained by the Shell Company or RMA, as to the quantities or types of waste materials generated,’ the report said.

“. . . During the Vietnam War, (1965-1969) the Army's waste diminished significantly but waste from the Shell insecticide plant was, and remains considerable. Still "no records were maintained," said the report."

2/8/76 – RMN – by David E. Greenberg. *“. . . That's because few records were kept through most of the facility's 30-year history of producing, testing, and dumping toxic chemical wastes. For example, 80 tons of a biological agent that causes wheat rust, a blight that destroys grain crops, was buried on the arsenal grounds a few years ago. Arsenal officials don't know exactly where."*

7/20/80 - RMN - by Al Gordon, Washington Bureau. "Much of the buried waste isn't inventoried and officials aren't sure they have found all of it.

"We've found wastes in places I've never expected," Whitney [Arsenal spokesman, Art Whitney] said. He said he wouldn't call any part of the property safe unless it had been inspected and found free of contamination."

7/11/82 - Denver Post - by Judith Brimburg. *Map identifies areas of chemical dumping that includes a long, narrow area running northwest to southeast. "Not all sources of contamination are known, US Army scientists acknowledge."*

12/5/82 - Denver Post. "Adams County and Commerce City are interested in acquiring all or part of the arsenal in spite of the fact that problems there still are not fully known."

“. . . the difficulties that might be involved in using that land for other purposes - an airport, industrial area or housing - are not fully known." Art Whitney, spokesman for the Army.

12/5/82 - Denver post, by Pat McGraw. *"After years of study and expenditures in the tens of millions of dollars, officials say no one is certain yet exactly what vestiges remain from decades of lethal chemical production and storage at the arsenal.*

"There are several problems that have come to light at the arsenal that have not been subject to public debate as decisions approach on the use of the property. They include: . . . the discovery of dangerously corroded containers of mustard gas buried on the arsenal during or after World War

II. Other drums and barrels apparently as yet unidentified war gases or chemical agents have been discovered in unmarked sites, and the possibility is strong that further such discoveries will be made.

“ The discovery that phosphorous used at the arsenal during World War II for the production of incendiary bombs was disposed of in at least one case by burial on the arsenal grounds.”

“The arsenal was strictly rural when development of the facility began in 1942 and some of the property was used as a firing range to test mortar shells. Some did not go off and are presumed buried in the soil to this day.”

1/5/83 - Denver Post. By Fred Gillies. “The consulting firm’s (Washington D.C. firm of Coopers and Lybrand) report cites the following factors ‘which make it difficult to determine the full extent’ of the contamination problem at the arsenal and assesses possible alternate uses for the arsenal: The unknowns, including the extent of unrecorded spills and burial over the years of old and defective munitions.”

“John Bramble, City manager in Commerce City, said the study was commissioned ‘to take a realistic evaluation of what (contamination) is out there (at the arsenal). We were prepared to accept the fact that there is not as much contamination out there as we had believed, and that some areas were not contaminated. But it doesn’t appear as such, based on research done to date.”

2/7/88 - RMN. By Janet Day. *Map shows waste sites on WTP. Mustard, White phosphorus grenades, and railroad yard suspected-cancer-causing chemicals dumped.*

f. Mapping the On-Post Groundwater Plumes

Maps of the contaminated groundwater plumes were created in the early 1990s before the remedy was selected and On-Post and Off-Post Records of Decision were signed. There has been no mapping of the On-Post groundwater plumes since that time.

The SSAB believes that it is essential for the public to have maps of the On-Post plumes of contamination in the groundwater. The SSAB formally requests that an On-Post plume map be created, based on current data, before the Revision of the Long-Term Groundwater Monitoring Plan is completed, providing evidence as to the validity of the

assumptions that underlie the selected remedy, and confirming the degree of success of the remedy design and operations to date.

In addition, the SSAB formally requests that an On-Post plume map be created at least every five years – to coincide with the Five Year Review, based on data collected within six-months before the creation of the map. Such plume maps are already being created for the Off-Post groundwater plumes. This will allow the community the ability to visually see the progress – and assess the continued protectiveness - of the Long-Term Groundwater remedy both On-Post and Off-Post. This will be particularly important when the remedy has been completed and the Regulators have assigned the RMA Five-Year Review to personnel who do not have an historical knowledge of the RMA.

g. **Minimal “Clean-Up” at RMA**

It is important for everyone to remember that the “clean-up” at RMA is designed to be minimally protective. The remedy is designed to protect the public to a level of 10 (-4). This means that after the RMA “clean-up” is complete, exposure to the contamination left at RMA will provide additional cancer risk to one in ten thousand people (this is in addition to the current cancer rates in the United States: one-in-two men will have cancer and one-in-three women will have cancer during their lifetimes). This is the minimum level of “clean-up” allowed by law and, at the time this remedy was selected, the standard level of “clean-up” was 10 (-6) or a one-in-one-million increase in the cancer risk.

The SSAB objected to a minimal “clean-up” at RMA, and has tried to be diligent in its oversight of the RMA “clean-up” precisely because a minimum “clean-up” demands that the assumptions underlying the remedies are valid, that the “clean-up” is designed and performed at the highest possible level, and that long-term monitoring is effective and the long-term remedy is protective of human health and the environment. If every step taken at RMA is as minimized and compromised as the choice of the RMA remedies, the community surrounding and visiting the RMA will be harmed and the State of Colorado will pay a huge price to try to correct the problems.

h. **Institutional controls**

Given the fact that the public has had to accept the presence of thousands of tons of contaminated soil being left at the RMA, and that over one-square mile of contaminated land has become a sacrifice zone, and that there is no quantification or cataloguing of the remaining contamination in Basin-A, and that there is no barrier between the contamination and the groundwater, and that every remedy related to the control and treatment of the contaminated groundwater is un-proven, the institutional controls that

are used and will be used to control contamination and protect the public must be absolute and fool-proof. That is no where near the case at RMA.

In our limited survey, we have been able to identify thousands of land transfers in the Off-Post area that have NOT included the required notice of below-surface contamination emanating from the RMA. Deed restrictions are one of the only institutional controls used Off-Post and have been discussed many times with the public. The fact that there are no groundwater or CERCLA easements contained in thousands of sales documents shows that the deed restrictions put in place by the Polluters are inadequate and not functioning as intended by the public.

During the years 2000 – 2005, all Off-Post contamination pathways were not closed and the public was not protected. We are aware of homeowner/developer struggles to acquire the so-called replacement water, provided in the ROD, at properties where existing wells continue to analyze “positive” for military contamination. In addition, we are aware of a landowner in the contaminated Off-Post area of RMA who was able to obtain a permit to drill a well, contrary to the “advertised” institutional controls required by the ROD.

This issue also raises the concerns about the inadequate number of sampling and monitoring wells, which are necessary to provide data to insure long-term protection. In order to protect the community and to insure that there are no open pathways to the tons of contamination that have been left in place, the amount of information and data should be increasing over time, rather than decreasing. For all these reasons, the public cannot consider the assurances of protectiveness as adequate, let alone fool-proof.

6. 2010 Long Term Monitoring Plan

The RMA-SSAB has an EPA Technical Assistance Grant (TAG) and our technical advisor is Intera Inc. and they have provided an analysis of the 2010 Long Term Monitoring Plan, and their report is included herein and attached. Based on this report and consultations with Intera, we believe that the 2010 Long Term Monitoring Plan does not provide long-term protection of public health and the environment, as set for the below.

Review of the Long-Term Monitoring Plan for Rocky Mountain Arsenal

Revision: 0

Prepared for:

**The Site Specific Advisory Board of the Rocky Mountain Arsenal, Inc
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Prepared by:

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Prepared by:	Richard Jackson, Marsh Lavenue and Abhishek Singh	
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