

October 30, 2002

Mr. Bill Vinzant
Project Manager, KACC
Kaiser Aluminum & Chemical Corporation
9141 Interline Avenue, Suite 1A
Baton Rouge, LA 70809

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION REGARDING THE PHASE 2
DECOMMISSIONING PLAN

Dear Mr. Vinzant:

The U.S. Nuclear Regulatory Commission (NRC) has completed its review of Kaiser Aluminum and Chemical Corporation's (Kaiser), Phase 2 Decommissioning Plan (DP) for the Tulsa Facility, Tulsa, Oklahoma, dated June 2001, and DP Addendum dated May 2002. Attached is NRC's formal request for additional information (RAI). The RAI is based on information submitted in: (1) Kaiser's written responses to NRC's preliminary comments on the DP, dated June 6, 2002; and (2) the DP Addendum.

In general, it appears that Kaiser adequately responded to NRC's preliminary comments on the DP. However, the staff is disappointed that many of the responses include only a commitment to revise the DP but do not include the exact wording that will be found in the DP. Therefore, we are unable to verify that Kaiser has appropriately addressed many of NRC's comments at this time. NRC will verify the adequacy of Kaiser's comment resolution during our review of the revised DP. Accordingly, the RAI contains: (1) comments on those responses deemed unacceptable or incomplete in the June 6, 2002, letter; and (2) comments on the DP Addendum.

If you have any comments or questions concerning this letter, please contact me at (301) 415-6607.

Sincerely,

/RAI

John T. Buckley, Project Manager
Decommissioning Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Attachment: Request for Additional Information

Docket No. 040-2377
License No. STB-472 (Terminated)

October 30, 2002

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Dear Mr. Vinzant:

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Attachment: Request For Additional Information

Docket No. 040-2377
License No. STB-472 (Terminated)

Ticket: DCB-323

AN: ML

Template: NMSS/RGN Materials - 001

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| DATE | 10/30/02 | | 10/ 30 /02 | | 10/30/02 | | | | | | | |

Kaiser Aluminum Corp
Request for Additional Information (RAI)
for the
Phase II Decommissioning Plan (DP)
and
Phase II Decommissioning Plan Addendum

The comments are based on comparing the Kaiser DP against the requirements of the SRP (NUREG-1727) in preparing a DP, and guidance given in NUREG-1507 (survey instrumentation) and NUREG-1575 (MARSSIM) in planning and implementing final status surveys. Regarding the Kaiser letter of June 6, 2002, NRC's comments fall into three categories; (1) acceptable resolution of NRC concern; (2) indeterminate resolution of concern because of lack of technical information; and (3) unacceptable or incomplete resolution of NRC concern. NRC comments with acceptable resolution are not reiterated below. Accordingly, this RAI identifies three types of information needs: (i) information to resolve NRC comments because resolution is deemed incomplete or unacceptable based on Kaiser's letter of June 6, 2002, (ii) information Kaiser committed to provide but did not include enough technical detail in the letter of June 6, 2002; and (iii) information to address NRC comments identified during the review of the DP Addendum. The comments listed below bring forward all remaining outstanding issues associated with the NRC's review of the DP and DP Addendum. In responding to this RAI, Kaiser should submit to NRC, one document that contains all of the requested information, including a reiteration of the acceptable responses presented in the June 6, 2002, letter. Finally, in reviewing the next revision of the DP, the NRC's evaluation will confirm that Kaiser's responses and commitments, as presented in their entirety, have been fully incorporated.

A. Kaiser Aluminum Phase II Decommissioning Plan (June 2001)

The following items need to be addressed and updated as indicated below. The original designation of each comment (e.g., "b.," etc.) has been retained so as to facilitate any cross-referencing with the responses provided in the Kaiser letter of June 6, 2002.

Section 2.0 - Facility Operating History

- b. Current characterization does not capture the expected range of Th-232 contamination given that the license once authorized Mg-Th alloys with Th as high as 4% by weight.

The response needs to reflect that more recent characterizations have revealed Th-232 concentrations as high as 6,400 pCi/g since such concentrations are higher than the theoretical value of 4,400 pCi/g cited in reply to this comment.

- c. Provide descriptions of the types of licensed material expected or known to be present in debris piles.

The response needs to state if surface contamination levels were ever assessed on contaminated debris and related materials; present prior survey results, if any; and, if not, provide a best estimate as to what the range of expected contamination levels might be based on the most recently available data.

- h. Address whether radioactive materials were ever disposed or buried of onsite under the requirements of 10 CFR Parts 20.302 and 20.304, or provisions of NUREG-1101.

The response only commits to further elaboration and provides no specific details at this time.

- i. Provide the full reference for the cited ratios of Th-230-to-Th-232 of 3.5-to-1. Add the basis as an attachment to the DP for the sake of technical completeness.

The response only commits to further elaboration and provides no specific details at this time.

Section 4.0 - Radiological Status of Facility

- i. A review of App. A of either the Aug. 2000 or Nov. 2001 GW Quality Report indicates that several Field Water Quality Sampling Forms and Analysis Data Sheets are incompletely filled out or missing. In addition, the following items were noted to be missing: results for gross alpha activity analyses could not be found in the included lab reports; and several of the lab reports are missing their case narrative cover sheets and/or chain-of-custody forms.

If gross alpha activity analyses were not conducted on water samples, the response needs to state that gross alpha activity results reported in the ground water quality reports were inferred from U and/or Th isotopic analysis.

Section 8.0 - Planned Decommissioned Activities

- a. The discussion addressing the presence and radiological characteristics of any remaining subsurface piping, pumping station, culverts, and sanitary or industrial sewers (see Section. 3 topics) is incomplete.

The response only commits to further elaboration and provides no specific details at this time.

- b. Incorporate the information of building facilities and/or grounds described as the "Operational Area," located south of the Union Pacific Railroad, and identify all areas slated to be surveyed "during the additional characterization event(s)" - See update presented in "Kaiser Work Plan - Characterization of the Operational Area (Dec. 2001) and "Additional Site Characterization Activities" (Nov. 2001).

The response only commits to further elaboration and provides no specific details at this time.

- c. Regarding contamination control, the text does not describe specific measures for isolating and controlling access to survey units that have been surveyed and found to meet the release criteria. Describe the administrative process that will be used to periodically inspect and monitor such areas and identify investigation flags that will be used to de-list and re-survey areas previously meeting the release criteria, given that work will be conducted around these areas in multiple fronts.

In addressing the administrative process, the response needs to present or commit to the development of radiological criteria and action levels (surface and volumetric) that would ensure that areas and their immediate surroundings found to meet the cleanup limits are routinely monitored and flagged should re-contamination be suspected or known to have occurred.

- d. Confirm that the radiological conditions of the areas used to stockpile contaminated materials will be confirmed before and after the installation of berms, ditches, and geomembrane liner.

The response only commits to further elaboration and provides no specific details at this time.

- h. Material segregation will involve soils, dry-active waste, debris, and other types of solid wastes. As written, the text is silent on the use of different survey and sampling methods, survey instrumentation and laboratory support (on and offsite), QA/QC measures, and application of release criteria for material and waste governed by NRC FC 83-23, disposal options of 10 CFR Part 20.2002, waste disposal at Envirocare vs WCS facilities, and NRC policy on clearance.

The response only commits to further elaboration and provides no specific details at this time.

Section 9.0 - Project Management and Organization

- e. The list of subjects covered by the Contractor Work Plan needs to include site security, radioactive waste and material management, material and equipment monitoring and release, effluent monitoring and sampling, personnel monitoring, sample analysis (on and offsite lab support), ALARA review and approval, personnel training in recognition that some tasks may be complex, development of RWPs or SWPs for new tasks, radioactive waste and material packaging according to DOT regulations, and compliance with the waste acceptance criteria of disposal sites.

The response only commits to further elaboration and provides no specific details at this time.

- f. The training needs to focus on the objectives of the DP in addition to the topics normally required for radiation workers and general employee orientation. Specify the required training frequency for personnel involved in remediation activities. Also, note that the training needs to meet the requirements of 10 CFR Part 19, in addition to Part 20. Confirm that all training records will be maintained over the course and completion of all remediation activities.

The response only commits to further elaboration and provides no specific details at this time.

- g. Identify the role of an offsite analytical laboratory in supporting sample analysis (remediation support, worker monitoring, effluent monitoring, and sampling associated with final status surveys) and whom within Kaiser's management staff will be responsible for that oversight and coordination role.

The response only commits to further elaboration and provides no specific details at this time.

Section 10.0 - H&S Plan

- a. This section does not present the information and details specified in Modules 10.1 and 10.3 of the SRP - NUREG-1727. This section fails to fully address NRC requirements of 10 CFR Part 20 and guidance given in Division 8 Regulatory Guides and NUREG-1400.

A review indicates that certain elements of the responses do not fully acknowledge the requirements of 10 CFR Part 20 and Regulatory Guides 8.25, 8.34, and 8.15 on air sampling and monitoring in the workplace for both Th-232 and Th-230. For example, the proposed approach does not follow Table 1 of Regulatory Guide 8.25 in assigning ALI and DAC action levels in determining when sampling and personnel monitoring are needed. There is a need to acknowledge these requirements and Regulatory Guides in the DP and commit to the development of implementing procedures. Also, these topics will be the focus of NRC in-process inspections.

- b. Regarding the control of airborne radioactivity, the approach proposing to use engineered controls when dust becomes “visible” is totally unacceptable and contrary to all NRC requirements of 10 CFR Part 20 and guidance given in Division 8 Regulatory Guides.

As with item a. above, the response to the NRC comments indicates that it does not fully acknowledge the requirements of 10 CFR Part 20 and Regulatory Guides 8.25, 8.34, and 8.15 on air sampling and monitoring in the workplace for both Th-232 and Th-230. For example, the proposed approach does not follow Table 1 of Regulatory Guide 8.25 in assigning ALI and DAC action levels in determining when sampling and personnel monitoring are needed. There is a need to acknowledge these requirements and Regulatory Guides in the DP and commit to the development of implementing procedures. Also, these topics will be the focus of NRC in-process inspections.

Section 11.0 - Environmental Monitoring and Control Program

- a. This section does not present the information and details specified in Modules 11.1 to 11.3 of the SRP - NUREG-1727. Moreover, this section, by referencing Sect. 10.0 for the proposed approach in addressing air monitoring, fails to fully address NRC requirements of 10 CFR Part 20 and guidance given in Division 4 Regulatory Guides.

A review indicates that certain elements of the responses do not fully acknowledge the requirements of 10 CFR Part 20.2003 in complying with monthly average concentration limits and the application of the unity rule for combined discharges of Th-232 and Th-230. The discussion is silent as to how discharges will be evaluated in confirming when such releases can occur under the provisions of App. B Table 2 or Table 3 concentration limits. The approach does not consider NRC Information Notice 94-07 (Jan. 28, 1994) in addressing solubility criteria for liquid effluent releases in sanitary sewers. There is a need to acknowledge the Information Notice in the DP and either commit to the development of implementing procedures, or consider the disposal of such liquid wastes under the provisions of a Part 20.2002 request. Also, these topics will be the focus of NRC in-process inspections.

Section 12.0 - Radioactive Waste Management

- a. The waste characterization does not capture the expected range of Th-232 contamination given that the license once authorized Mg-Th alloys with Th as high as 4% by weight.

The response needs to reflect that more recent characterizations have revealed Th-232 concentrations as high as 6,400 pCi/g since such concentrations are higher than the theoretical value of 4,400 pCi/g cited in reply to this comment.

- b. Material segregation will involve soils, dry-active wastes, debris, and other types of solid wastes. The section is silent on survey and sampling methods, survey instrumentation and laboratory support (on and offsite), QA/QC measures, and application of release criteria for material and waste governed by NRC FC 83-23, disposal options of 10 CFR Part 20.2002, waste disposal at Envirocare vs WCS facilities, and NRC policy on clearance.

The response only commits to further elaboration and provides no specific details at this time.

Section 13.0 - QA Program

- h. The text is silent on the QA/QC functions associated with the ALARA process and how it will be implemented in plans and procedures associated with radiation exposures to site personnel and public, environmental releases, contamination control, and waste minimization.

The response only commits to further elaboration and provides no specific details at this time.

- g. Regarding instrument performance and checks, specify conditions as to what type of corrective actions will be taken, by whom, and time constraints for correcting any deficiencies.

A review indicates that the discussion does not fully address how prior data will be evaluated and what will be the factors that will be used to qualify prior data either as acceptable or deficient, and recognize the need to make new measurements as replacements for discarded data.

- h. Regarding non-conformance, specify conditions as to what type of corrective actions will be taken, by whom, when will regulatory notification be required, who will determine whether work stoppage is required, and time constraints for correcting all deficiencies.

The response is not specific as to the time frames and when deficiencies will be corrected. The response noting that deficiencies will be corrected in a "timely manner" is not responsive.

- j. Regarding audits and surveillance activities, the discussions need to note the frequency of audits and surveillance activities and how soon and by whom corrective actions will be taken in changing QA policy and procedures in light of identified deficiencies and non-conformances. As written, the text treats such issues as "recommendations" when they should be addressed as "directives" to correct violations of DP procedures and regulations.

A review indicates that the discussion does not present specific time frames for the frequency of audits and surveillance activities and how soon corrective actions will be taken in changing QA policy and procedures in light of identified deficiencies and non-conformances. The response does not address how such deficiencies will be resolved in a timely and responsive manner.

Section 14.0 - Facility Radiation Surveys

- b. Update the summary (Sect. 14.2.4) to include a full reference for the areas of the site that were remediated in the 2000-2001 time frame. Confirm that the Th-232-to-Th-230 ratios cited are correct (possible transcription errors?) and include a full reference for the citation. The comment about including a full reference also applies to Th-232-to-Th-230 ratios discussed in Sect. 14.2.2.

A review of the response indicates that the cited range of Th-232-to-Th-230 ratios is incorrect. The range cited in the response is 1:0.12 to 1:2.95, while prior data submitted by Kaiser give a range of 1:0.32 to 1:2.95. Reconcile this discrepancy if it is a typographical error, or provide the data to support the new range presented in this response.

- e. The discussion addressing the presence of the spillway structure, and other features not listed here (such as subsurface piping, pumping station, culvert, and sanitary or industrial sewers), is not followed through completion in this section. The discussion needs to elaborate on whether surveys will be conducted to determine if radioactive contamination is present in underlying soils and whether the contamination on such structures is surficially or volumetrically distributed. Moreover, the discussion must note that in planning such surveys, considerations will be given to the removal of residues, liquids, and sediment. In sections of pipes that are not accessible (e.g., within elbows, joints, transitions to different pipe diameters, etc.), access will be provided by drilling or cutting into those sections of the pipe to assess levels of residual of contamination over the full length of buried or embedded piping. The discussion needs to address how instrument radiation detectors will be chosen and calibrated while taking into account surface and detector efficiencies when dealing with widely varying survey conditions, detector-to-surface geometries, and varying condition of the internal surfaces of pipes. Revise the section to address considerations in planning surveys that may rely on different techniques and how the results from different survey methods will be combined and evaluated in demonstrating compliance with the appropriate DCGLs. Provide the release criteria for surficially contaminated material, and include descriptions of survey methods, instrumentation, calibration, and sensitivities.

A review indicates that the proposed approach for surveying and releasing material is not acceptable. Note that the NRC does not recognize ANSI/HPS N13.12 for the clearance of surficially and volumetrically contaminated material and equipment. The currently approved procedure is embodied in NRC FC 83-23 or its equivalent in: Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material, April 1993. Accordingly, the procedural outline noted in the response is not acceptable and needs to be revised to reflect only NRC release criteria and propose a survey methodology that is in accord with the criteria.

- h. (ii) describe the process that will be used in determining the total number of samples to be taken in each survey unit considering the DCGL, LBGR, estimate of the variability of residual radioactivity levels in the survey unit, and Type I and II error decision rates;

A review indicates that the survey design process needs to recognize that the variability (sigma) of contamination levels from Phase II remediation activities may be different than that observed for the adjacent land remediation (Phase I). Accordingly, sigma results from Phase I may not be relevant to other areas of the site being considered under Phase II, as contamination levels are expected to be differently distributed. Accordingly, the proposed approach needs to acknowledge that any variability in residual contamination levels will be evaluated and, that in

its application, the discussion will address how to deal with situations where Phase I sigma values might not be appropriate. Note that the use of inappropriately selected sigmas (i.e., Phase I values as default in planning Phase II final status surveys) may artificially temper the variability, which in turn could result in a survey design with an inappropriate number of samples and incorrect sampling density.

h. (iv) there is a need to revise the list (p.14-10) of currently impacted areas, survey units, and the classification to include the "operational area," the Freshwater Pond Area, and areas adjacent to the railroad track that will be re-surveyed in Phase II in response to the commitment made in the Phase I FSS Report;

The response is incomplete since the issues of concern are formerly remediated areas that are still currently impacted by high external radiation exposure rates. The currently elevated radiation levels associated with Phase II areas are causing interferences in confirming that the previously remediated areas meet the criterion for external radiation levels. Accordingly, the current DP needs to confirm that once all offending radioactive materials have been removed following the completion of Phase II activities, the areas previously remediated under the Phase I still meet their respective criteria. Note that this commitment was made in Sect. 5.0 of the Phase I Final Status Survey Report, Adjacent Land Area, Feb. 2002.

h. (vii) in discussing typical scan MDCs on p.14-12, change the reference from Table 14-1 to 14-6 and confirm that the stated MDCs apply to both NaI survey systems tabulated on p.14-11. In addition, provide scan and fixed MDCs for survey methods used to determine the presence of surface contamination.

A review indicates that Kaiser proposes to use the Eberline E600 survey instrument. Kaiser should be aware that the use of the E600 presents a number of operational challenges, based on NRC experience with another licensee who has proposed its use to conduct final status surveys. For this instrument equipped with larger gamma radiation detectors (NaI(Tl)), the audio output may be of limited use since above a count-rate of about 4,500 cpm only a steady tone is generated; thereby severely limiting the use of the audio signal for discerning changes in radioactivity levels while conducting final status surveys. Another operational feature of the E600 includes digital signal processing, in which a built-in algorithm applies an exponential smoothing function depending on the selected operating mode. The process of data smoothing has the immediate effect of diluting instrumentation response in detecting localized activity levels since exponential smoothing assigns exponentially decreasing weights as observations get older. The operational statistics of such a system and its application in conducting survey scans are different than that presented in MARSSIM, including those addressing scan MDC equations and signal detection theory as related to human performance. Eberline has informed the NRC (memo from Mr. Scott M. Rogers, April 28, 2002) that it has not performed any testing, nor MDA and MDC calculations for any combination of radiation detector probes with this instrument.

While it is recognized that Kaiser's approach relies on the use of innovative instrumentation, the use of the E600 could result in lowering the probability of identifying elevated activity levels and might not deliver an adequate level of protection in assuring that the results are equivalent to MARSSIM. Accordingly, there is a need to define instrument response characteristics over a range of expected survey conditions that would occur during the physical process of scanning over varying types of radioactivity distributions. The conditions under which the instrument is expected to be used and associated DQOs will need to be developed and documented as to survey parameters (scan speed and surface-to-detector distances); appropriate determination

and application of background characteristics in survey units with single or multiple materials or media; appropriate application of the instrument weighting factor; and that scan coverage is commensurate with the radiological conditions and classification of the survey unit.

Procedurally, survey technicians will need to be duly cautioned about the importance of the second stage survey process in confirming whether the instrument response and/or alarms are real and steps to follow is so, and, if not, that the decision to ignore the audio output and/or alarm is based on a technically defensible basis and is fully documented.

h. (viii) in discussing the use of NaI detectors for the conduct of FSS, state whether such detectors will be shielded or unshielded;

See comments and response to item h.(vii) above.

h. (ix) Sect. 14.11.2 addressing an alternative to the scanning method is confusing as to the method and criteria that will be used. Elaborate as to its equivalency to MARSSIM in detecting elevated residual contamination levels;

The response only commits to further elaboration and provides no specific details at this time.

h. (xv) provide the data for all background (reference area) measurements and confirm that they meet the statistical criteria of Sect. 3.4 of App. E to the SRP - NUREG-1575 - include data in an App. to the DP;

The response only commits to further elaboration and provides no specific details at this time.

18. Section 10.1.4 does not provide a description of the use of extremity and whole body monitors when the external radiation field is non-uniform.

The response only commits to further elaboration and provides no specific details at this time.

43. Section 13.3 should identify the QA records.

The list of QA records is incomplete. It should also include records such as final status survey data, equipment logs, etc.

B. Kaiser Aluminum Phase II Decommissioning Plan Addendum

Section 1.0 - Executive Summary

Update as needed in response to comments noted below.

Section 4.0 - Radiological Status of Facility

See specific comments below - Note that prior NRC comments addressing the Phase II DP (June 2001) and Kaiser's responses to them may need to be incorporated in their entirety or referenced in this section of the DP Addendum.

In Section 4.0 (introductory text), there is need to capture the information about the fact that the presence of radioactive material under the concrete paving and structures is being attributed to grading and constructing backfill activities and would result in a contamination distribution that is different than that observed elsewhere at the site. In turn, this information will be important in planning further characterization work and provide valuable input in designing final status survey specifications.

In Section 4.1 (Contaminated Structures), the NRC recognizes the value of conducting surveys using MARSSIM methodology. As was noted in a prior NRC comment, the MARSSIM methodology primarily applies to the conduct of final status surveys and that committing to use MARSSIM for characterization purposes and to monitor the progress of remediation activities may be an onerous self-imposed requirement. Also, note that the NRC guidance of NUREG-1727 and MARSSIM makes a clear distinction between surveys used for characterization purposes and final status surveys to confirm that the cleanup criteria have been met. Accordingly, Kaiser will need to qualify the context and basis as to how the survey results presented in Sect. 4.1 of the DP Addendum will be used in meeting the objectives of the DP. On a separate subject presented in Sect. 4.1, Kaiser needs to confirm if there are any records that provide documentation that the buildings and structures in question were demolished in the indicated time frames.

In Section 4.2 (Contaminated Systems and Equipment), the discussion needs to commit to the conduct of appropriate radiological surveys in confirming that the listed systems are free of radioactive contamination. The statement that "These systems are not expected to contain radiological contamination." alone is not an acceptable justification for the purpose of releasing such systems without a proper radiological assessment.

Section 8.0 - Planned Decommissioned Activities

Section 8.2 (Remediation Plan), a review of the respective subsections indicates that Kaiser will use a system (automated or manual) to segregate contaminated soils according to establish DCGLs for Th-232. The discussion needs to address that the radiological performance characteristics of whatever method Kaiser opts to use to segregate contaminated soils, will be calibrated and bench tested by Kaiser. The NRC will verify implementation and operation of the segregation method, during an inspection, prior to use.

In Section 8.2.1 (Summary of Remediation/Removal Activities), as an example, the discussion on backfilling previously excavated areas with clean fill and material meeting the derived cutoff concentration level (31.1 pCi/g) will need to be coordinated with the NRC. The coordination will provide the NRC with an opportunity to conduct any necessary confirmatory surveys before allowing Kaiser to backfill such excavations. Note that this NRC concern applies to all other proposed backfilling activities identified in all volumes of the Phase II DP.

4.0 Balance of DP Addendum; Sect. 2, 3, 5, 6, and 7, and Sect. 9 to 15

No additional NRC comments other than the prior ones addressing the Phase II DP (June 2001). Note that Kaiser's responses to them may need to be incorporated in their entirety or referenced in the respective sections of the DP Addendum, i.e., Sect. 2, 3, 5, 6, and 7, and Sect. 9 to 15.