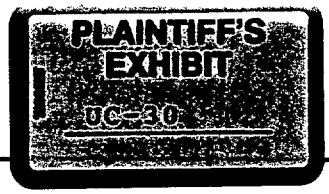
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INTERNAL CORRESPONDENCE



VI, E, 8

METALS DIVISION

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To (Name) F. J. Shortsleeve/R. W. Rebholz
Division UCC-Metals Division
Location 270 Park Avenue
New York, NY 10017

Date October 18, 1979

Originating Dept. "Calidria" Asbestos

Answering letter date

Subject EPA Study - Asbestos Mining Counties in California

Copy to Messrs.
G. R. Adams
T. W. Carmody
W. B. DeAtley
R. F. X. Fusaro
E. W. Kantz/R. G. Beverly
K. S. Lane
O. J. Malacarne
P. W. McDaniel
E. A. Piersall
H. B. Rhodes
G. F. Rouse
E. R. Weidlein
File

Please reference my letter (copy enclosed as Item I) on the same Subject dated 7/27/79, and the following other enclosures:

Item II - Extracts from SAI's proposal
Item III - Letter from SAI following our meeting in San Diego
Item IV - Letter to SAI from H. B. Rhodes with our comments on their protocol
Item V - SAI's 1979 Annual Report

Harry discussed this program with Paul McDaniel on 9/14/79. I talked to Paul today and he has not yet heard from SAI.

Although Harry and I will be glad to help in any way possible, I think this "project" should be handled by Division or Corporate environmental/governmental affairs groups and our Law Department. If you have any questions, please contact Harry or Paul.

John L. Myers/dal

JLM:dal
Enclosures

A 10638

ITEM II

1.2 Summary of Technical Approach

Our proposed technical approach is described in Section 3. Here we highlight the proposed tasks and key features. This effort is divided into four principal tasks in addition to reporting (documentation) functions: epidemiological protocol design; questionnaire development; source inventory and exposure characterization; and quality assurance.

The epidemiological protocol design task is both the directing and synthesizing function. This segment proceeds immediately to examine the mortality data. It is this data base in conjunction with the exposure characterization that will provide the basis for most decisions in the design of the protocol. Therefore immediate attention will be given to securing the necessary demographic information, mortality breakdown, source inventory and other data sources. During this proposal effort we have identified and located virtually all relevant available information including mortality figures. We plan on reviewing hard copy death certificates as well as company asbestos monitoring files to support our work. This task will be directed by a medical epidemiologist with experience in all required phases of the protocol design.

The questionnaire development task is clearly outlined in Section 3.3. Although we will not draft this until the supporting data have been examined enough is currently known which would allow us to proceed directly to an advanced point. Having just completed a questionnaire for another EPA sponsored epidemiological study, our task leader is quite familiar with EPA and OMB approval procedures and, of course, meeting study requirements in questionnaire construction. The questionnaire will be drafted, pre-tested, redrafted, and then submitted to EPA for its initial review. Subsequent to the review the same process will be repeated. We anticipate this procedure will allow us to fully integrate the specific requirements of the study protocol, satisfy EPA Epidemilogy Branch review, and provide the justification - quality assurance - and other necessary supporting statement requirements.

Received by JLM & HBR at meeting in San Diego with the following: R.A. Ziskind, Deputy Division Mgr } Science Applications, Inc
J.L. Hahn, Staff Scientist

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We interpret the source inventory and exposure characterization task as a performance requirement for this proposed study. That is, we have estimated the effort to complete rather than plan or initiate the task. If incorrect, our budget should be modified. However, we believe our interpretation to be correct since it is an indispensible part needed to evaluate alternative approaches to conduct the epidemiological field study. A feature of our study approach is the success we have had in obtaining details on emissions sources and cooperation from individuals in governmental and private organizations. We anticipate no serious difficulties in assembling the most comprehensive estimate of sources, emission levels and exposure isopleths for the areas. We plan on including the three designated counties and several others such as Tuolumne and Monterey since probable high exposure areas have been identified there. Figure 1-1 shows the general areas of interest centered around King City - Coalinga in the lower left and Copperoplis-Jamestown in the upper center. The mining/milling sources and the commerical establishments registering use of asbestos have been identified and emissions estimates will be constructed. All significant sources of asbestos including the natural background, mobile sources (ore and tailings hauling, vehicle friction materials, etc.), use of serpentine rock, quarry locations, etc. will be evaluated either by means of direct environmental or occupational measurements, existing emissions factors, or available models. In addition the asbestos monitoring program personnel at EPA-RTP have decided, in conjunction with our suggestion, to monitor quarry site and vehicle induced roadway asbestos levels in the Calaveras County area. This data will be taken in October 1979 and be fully integrated into air exposure determination. This task will be performed by two team members with direct experience in constructing emissions inventories of carcinogens.

Quality assurance has been defined as a separate task entity in order to draw attention to its role and provide a distinct focus for documentation and review. Although elements of QA have been discussed in each of the task sections 3.2-3.4, we have designated specific program deliverables in our proposal schedule which will report on this specific program component.

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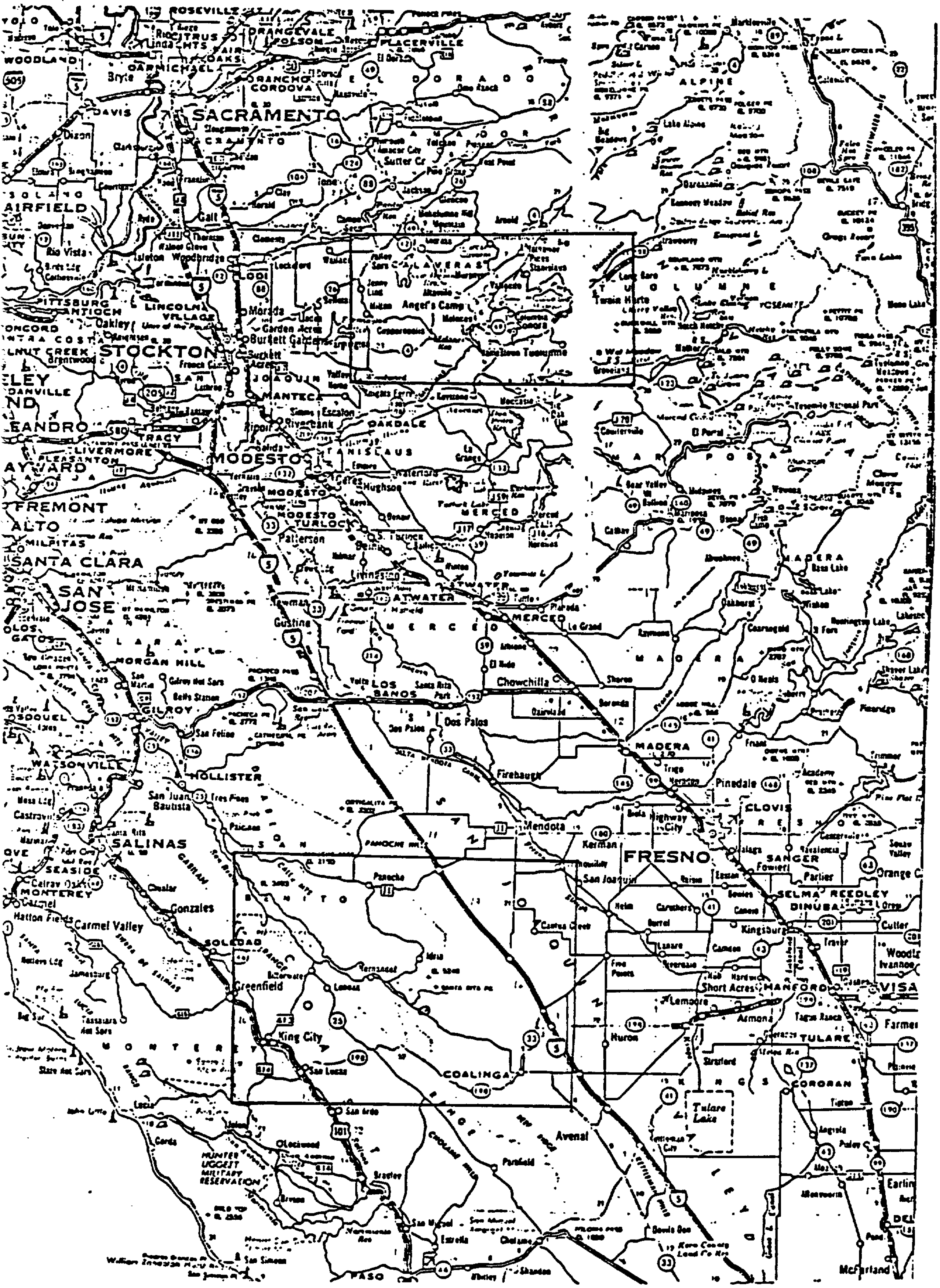


Figure 1-1. California Areas of Interest to the Program.

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Furthermore, as indicated above the supporting statement for questionnaire approval will detail the associated QA elements. All key program staff will participate in accomplishing this task. The Principal Investigator will be the task leader because of his experience and the program-wide nature of this effort.

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3.4 Source Inventory and Exposure Characterization

3.4.1 Overview

During this study we will identify, analyze and document all significant sources of asbestos in the geographical areas of interest. This will include man-made as well as natural sources and the present as well as the past time period. In addition to stationary sources the impact of vehicle sources will be addressed. In the latter category are friction material emissions, the effect of traffic over roads of asbestos bearing material, and the transportation of asbestos mine ore and mill tailing. We have identified much of the source information and foresee no difficulty in completing this task component.

After the source inventory is completed the exposure characterization component will be undertaken. Emissions estimates will be derived from several sources including particular plant monitoring; ambient monitoring data; calculations based upon vehicular traffic and modeling; and emissions data from similar plant types. It will be possible to develop estimates of ambient concentrations as a function of location within the counties and time period. Admittedly the exposure mappings will be approximate measures rather than precise determinations, however based upon our prelimininary findings there appear to be several hot spots which historically may have experienced significantly elevated asbestos concentrations. We will partition exposure into airborne and waterborne routes and present the range of uncertainty to be associated with the determinations. The results of this task will be exposure isopleths which can be utilized in conjunction with the mortality information to examine the relationship between the two.

The source inventory and exposure characterization will be established such that during the conduct of the epidemiological field study these may be drawn upon in both tracing an individual's occupational exposure and determining their ambient exposure contribution. Details of these sub-tasks are provided in the following section.

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3.4.2 -- Task III Methodology and Data Sources

Table 3.4.-1 illustrates some of the factors associated with Task III - Source Inventory and Exposure Characterization. Quite a good start has been made in accomplishing this task through the proposal period. We believe that the necessary data sources and contacts have been established which assure a comprehensive inventory and exposure determination. We plan to document the asbestos inventory and exposure back through the last thirty years and develop reasonable estimates to account for the necessary prior period.

The largest industrial sources in the three county area are the mining/milling operations.

Atlas Asbestos - Mine/Mill - Fresno County

Colocated mine/mill started in early 1960's at same capacity. Very little control in place until 1974

Union Carbide - Mine - San Benito County; Mill - King City, Monterey County

Operation under Union Carbide started in the early 1960's. Ore is blased one summer every three years and hauled each summer to stockpile at mill site. This mill is primarily a "wet" process until product goes to the driers. No official reporting on ore and tailings piles. Heavy winds frequently present (∿ 30 mph) causing widespread dispersion in the past in King City, Coaling and San Lucas.

Calaveras Asbestos - Mine/Mill - Calaveras County

Colocated mine/mill with over 30 years of operation under different ownerships. One of the largest capacity facilitis in the county. Complaints of dust clouds over the 13 year active Melones Dam construction site and town of Jamestown. Uncovered tailings pile and daily blasting required to mine rock bearing mineral content.

Emissions estimates have been gathered from both the latest Air Resources Board Emissions Inventory System and their 1972 assessment and are presented below.

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Table 3.4-1

SOURCE INVENTORY AND EXPOSURE CHARACTERIZATION COMPONENTS

Source Identification

Scope of the Task Will Include

- Air and Water
- Man-made and Natural
- Stationary and Mobile
- Present and past

Inventory Identification

- OCCU Registration Files - Cal OSHA
- NESHAPS Listings
- Mining Section - Cal OSHA
- Cal. Air Resources Board - Emission Inventory System

Data Sources Will Include:

- Occupational Monitoring
  - OCCU - Cal OSHA
  - Mining Section - Cal OSHA
  - Specific Companies
- Environmental Monitoring
  - Cal. Dept. of Health (Water Sanitation Section & Air & Industrial Hygiene Lab)
  - County Health Department
  - EPA NESHAPS
  - Regional Water Quality Control Boards
  - Specific Company
  - Cal. Air Resources Board
  - Local Air Pollution Control Districts

Emission Estimation

Synthesis Based Upon:

- Published Emission Factors
- Monitoring Data
- Plant Process and Operating Information
- Area Meteorology
- Air Quality Models

Product

Exposure Isopleths

Airborne and water-borne contributions

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1978

Atlas Asbestos

asbestos dryer	20 tons/year	total suspended particulate
conveying and handling of tailings	24 tons/year	total suspended particulate
conveying and handling of ore	12 tons/year	total suspended particulate

Union Carbide

asbestos drying	3 tons/year	total suspended particulate
ore and tailings pile	not available	

Calaveras Asbestos

asbestos pit blasting	126 tons/year	total suspended particulate
secondary and tertiary crushing	19 tons/year	total suspended particulate
asbestos separation and mill grinding	1 tons/year	total suspended particulate
dry rock storage	2 tons/year	total suspended particulate

1972

Atlas Asbestos

asbestos dryer	843 tons/year	total suspended particulate
conveying and handling of tailings	110 tons/year	total suspended particulate
conveying and handling of ore	60 tons/year	total suspended particulate
milling	66 tons/year	total suspended particulate
crushing and screening	60 tons/year	total suspended particulate

Union Carbide

wet processing and drying	31 tons/year	total suspended particulate

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Calaveras Asbestos (then Pacific Asbestos Corp.)

plant	2254 tons/year	total suspended particulate
mining	900 tons/year	total suspended particulate
primary crushing	36 tons/year	total suspended particulate
recrushing and screening	27 tons/year	total suspended particulate
fines milling	27 tons/year	total suspended particulate
dry rock storage	2250 tons/year	total suspended particulate

The asbestos content in ore for the two western mining sites ranges between 30 to 60 percent whereas the eastern site (Calaveras) ranges between 5 to 6 percent. However the eastern site requires daily ore blasting and is a larger scale operation. It should be mentioned that the two deposits differ in their fibre type with the western the short fibre and the eastern the "mixed Canadian."

Clearly there are omissions and inconsistencies in this reported information. We propose to review the extensive plant files for emissions monitoring and process descriptions in order to complete the source detail and emissions determination. Area meteorology is available from each region and a straightforward determination of dispersion will be made using average parameters and a gaussian plume model.

One major plant, Coalinga Asbestos, was located in the San Benito County area. It was owned by Johns Mansville and closed down in 1974. We are aware of the plant capacity and its design and will review region files to establish its source strength. Our estimates will be based upon the methodology we established in a previous study of coal train dust sources (Rogozen, 1977).

Asbestos measurements in California ambient air were summarized recently by SAI in its California Air Resources Report Inventory of Carcinogens (Hargler, 1979). The King City and San Lucas levels are the highest on the list and represent values taken under current plant control conditions. Comparison of the 1978 and 1972 data grossly illustrates how much control of processes may have

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Table 3.4-2
AMBIENT AIR SAMPLING LEVELS

Location in California	Number of Fibers/m^3	References
King City, downwind of a milling plant	6,000 to 1,600,000	John et al., 1976
King City, upwind of a milling plant	200 to 11,000	John et al., 1976
San Jose	0 to 3,500	Murchio et al., 1973
Berkeley	0 to 4,000	Murchio et al., 1973
Los Angeles (Downtown)	0 to 5,700	Murchio et al., 1973
Emeryville, near asbestos manufacturer	238,000	Murchio et al., 1973
White Mountain (desert)	20 to 100	Murchio et al., 1973
Santa Monica Freeway, upwind (at 4th)	700*	Murchio et al., 1973
Santa Monica Freeway, downwind (at 4th)	700*	Murchio et al., 1973
Harbor Freeway, upwind (at 146th)	1,100*	Murchio et al., 1973
Harbor Freeway, downwind (at 146th)	1,600*	Murchio et al., 1973
San Diego Freeway, upwind (at National)	200*	Murchio et al., 1973
San Diego Freeway, downwind (at National)	800*	Murchio et al., 1973
San Diego Freeway, upwind (at 122nd)	900*	Murchio et al., 1973
San Diego Freeway, downwind (at 122nd)	500*	Murchio et al., 1973
Los Angeles Freeways, upwind (four sites)	800**	Murchio et al., 1973
Los Angeles Freeways, downwind (four sites)	900**	Murchio et al., 1973
San Lucas	1,000,000	Wesolowski, 1975
Berkeley	700,000	Wesolowski, 1975

* Mean values

** Mean value of 60 samples

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reduced levels. Furthermore the production of asbestos in California was 78,390 tons in 1978 which represents a drop of 40 percent from the 1966 production. Of the five sites active then only three are currently open. Figure 3-1 shows the principal asbestos deposits in California. Locations of all mines and mills are known. All quarries will be identified and located and significant asbestos deposits and outcropping will be described with the assistance of the Mining and Tunneling section of Cal OSHA.

In summary, the primary attention for man-made asbestos sources will center on the past and present mining and milling sites. A good deal of plant and environmental monitoring data are available through a number of private, local, state, and federal studies. We have summarized some information resources in Table 3.4-1 and named particular individuals within the groups and their contribution in Table 3.4-3. In this way we have uncovered previously unpublished data including the Fresno County ambient sampling of the Coalinga area done in 1973.

Other man-made sources which will be considered include the users and processors of asbestos. We have searched the Occupational Cancer Control Unit files for asbestos users who have registered in the surrounding counties. These are summarized in Table 3.4-4. Other information available on them is their 4-digit Standard Industrial Classification code and their exact address. In some cases, OCCU workplace monitoring for asbestos was conducted. We have access to these files and will be able to retrieve any available monitoring data. Based upon knowing the nature of each operation we will be able to assign emissions factors for the significant sources among these. More importantly perhaps will be an ability, in the future, to associate employer information with asbestos expsoure for members of the case or control cohort. We believe that no significant sources will remain unidentified by using these files and through discussions with each cognizant county air quality officer. We recognize that building materials, schools, demolition and various other uses of asbestos are responsible for exposure to the general population. Unless occupationally related (such as an insulation sprayer) we will estimate the average

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population exposure from the available literature rather than attempt to perform a detailed area survey to determine individualized dose.

We will however attempt to determine the nature and extent of asbestos exposure which although widespread may be significant and unevenly distributed among the population. For example, asbestos containing talc is used as a pesticide carrier in certain parts of the counties. We can establish the areas and tonnage by consultation with state pesticide control people. Additionally, particular areas have a high concentration of use of serpentine in paving materials. Widespread use has been identified in San Joaquin, Eldorado, Amador, Placer and Calaveras counties. We will estimate the dust blowing from such roads based upon measurement data (Woods,1979) literature and various models (such as Becker, 1979). One useful indication of environmental asbestos levels in the air will be the total suspended particulate values in the three air quality districts of interest (North Central Coast, San Joaquin, Mountain). These will provide gross measures of the seasonal variation and approximate total suspended particulates (tsp) concentrations in the area.

Finally, friction material from vehicles are known to be sources of asbestos. It will be straightforward for us to calculate the emissions since the Principal Investigator directed a vehicle study on brake systems which addressed asbestos friction materials (Ziskind, 1979). We will obtain vehicle traffic estimates from the state highway agency, CALTRANS, to support these determinations.

In summary we will establish an inventory and estimate the strength of the following sources:

1. asbestos mining and milling (including haulage)
2. asbestos containing quarries
3. serpentine rock use in road grading
4. stationary sources, asbestos users and processing
5. general uniform population exposure due to consumer products, building construction materials, demolition, etc.
6. vehicle friction materials
7. natural water and air sources

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All airborne and waterborne environmental monitoring data will be centralized in one document section and a mapping produced. We appreciate that monitoring data taken has been nonuniform with respect to analysis method, approach, and quality. We will judge the usefulness of each data element and evaluate its value to the exposure characterization.

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